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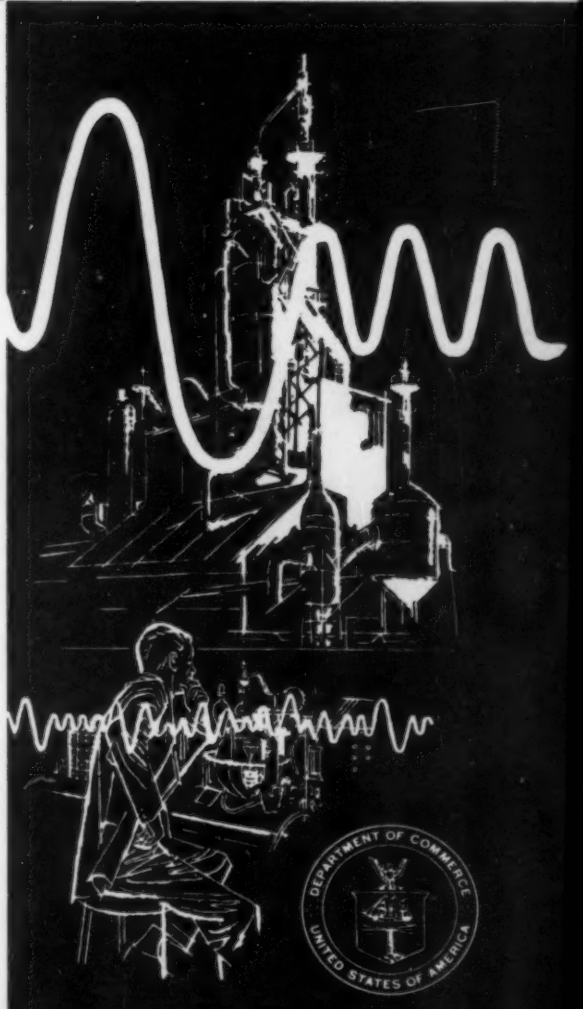

U. S. DEPARTMENT OF COMMERCE
BUSINESS AND DEFENSE SERVICES ADMINISTRATION
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U.S. GOVERNMENT RESEARCH REPORTS

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Luther H. Hodges, *Secretary*

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*AZIDES

AD-272 988 62-2-4 DIV. 4
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(*BARIUM COMPOUNDS, *AZIDES, *DECOMPOSITION, TEMPERATURE, HEATING, X RAYS, RADIATION EFFECTS, REACTION KINETICS, THEORY, MATHEMATICAL ANALYSIS,) USSR,

*BACKWARD-WAVE AMPLIFIERS

AD-272 658 62-2-4 DIV. 8
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY,
(*BACKWARD-WAVE AMPLIFIERS, *MAGNETRONS, RADIOFREQUENCY AMPLIFIERS, ELECTROMAGNETIC WAVES, WAVE TRANSMISSION, ELECTRON GUNS, ELECTRON BEAMS, TRANSFORMATIONS (MATHEMATICS),) *NOISE (RADIO), PERTURBATION THEORY, MATRIX ALGEBRA, INTEGRAL EQUATIONS, THEORY, MEASUREMENT,)

*BALL BEARINGS

AD-272 595 62-2-4 DIV. 26
WESTINGHOUSE ELECTRIC CO., EAST PITTSBURGH, PA.
(*LUBRICATION *BEARS, *BALL BEARINGS, LOW PRESSURE RESEARCH, MATERIALS, FRICTION, EVAPORATION,) (LUBRICANTS, *POWDERS, SOLIDS, POROUS MATERIALS, *PLASTICS, BEARINGS, *ALLOYS, CERMETS, POWDER METALS, SINTERED ALLOYS,) (TEST EQUIPMENT, VACUUM APPARATUS,)

*BALLOONS

AD-272 581 62-2-4 DIV. 16
NAVAL SCHOOL OF AVIATION MEDICINE, PENSACOLA, FLA.
(*BIBLIOGRAPHY, *ASTRONAUTICS, *SPACE MEDICINE, *SPACE FLIGHT, SPACE CAPSULES, WEIGHTLESSNESS, BALLOONS, MANNED, COSMIC RAYS, MAN, LABORATORY ANIMALS,) SCIENTIFIC RESEARCH,

*BARIUM COMPOUNDS

AD-272 988 62-2-4 DIV. 4
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(*BARIUM COMPOUNDS, *AZIDES, *DECOMPOSITION, TEMPERATURE, HEATING, X RAYS, RADIATION EFFECTS, REACTION KINETICS, THEORY, MATHEMATICAL ANALYSIS,) USSR,

*BEAMS

AD-272 664 62-2-4 DIV. 25
ROCK ISLAND ARSENAL LAB., ILL.
(*BEAMS, *DEFLECTION, *LOAD DISTRIBUTIONS, SHEAR STRESSES,) (STRESSES, MATHEMATICAL ANALYSIS,)

*BEARINGS

AD-272 986 62-2-4 DIV. 17
FRANKFORD ARSENAL, PHILADELPHIA, PA.
(*ALLOYS, *METALS, MILITARY REQUIREMENTS, STRUCTURES, *BEARINGS, HIGH PROPERTIES, HARDNESS,) (LEAD, TIN,) (*IN TEMPERATURE RESEARCH, DATA, MELTING, TENSILE ALLOYS, LEAD ALLOYS, ALUMINUM ALLOYS, CADMIUM ALLOYS, MAGNESIUM ALLOYS, ZINC ALLOYS, COPPER ALLOYS, ANTIMONY ALLOYS, SILVER ALLOYS, ARSENIC ALLOYS,)

*BEHAVIOR

AD-272 894 62-2-4 DIV. 28
RAND CORP., SANTA MONICA, CALIF.
(SIMULATION OF *REASONING BY *COMPUTERS,) *BEHAVIOR, PROBABILITY, MEMORY, LEARNING, MATHEMATICAL ANALYSIS, MATHEMATICL LOGIC, CYBERNETICS, INFORMATION THEORY, *COMPUTER LOGIC, MATHEMATICAL PREDICTION,

*BERYLLIUM POISONING

AD-272 693 62-2-4 DIV. 16
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(*BERYLLIUM POISONING, COUNTERMEASURES, BERYLLIUM COMPOUNDS, TOXICITY, LABORATORY ANIMALS, FEASIBILITY STUDIES,)

*BETATRONS

AD-272 557 62-2-4 DIV. 25
WILLIAMSON DEVELOPMENT CO., INC., *EST CONCORD, MASS.
(*PLASMA PHYSICS, *BETATRONS, ELECTRON BEAMS, PARTICLE ACCELERATORS, GAS FLOW, GAS IONIZATION, MAGNETIC FIELDS,) (INSTRUMENTATION, DESIGN, OSCILLOSCOPES, COILS, TRANSFORMERS, TRIODES,)

AD-272 558 62-2-4 DIV. 25
WILLIAMSON DEVELOPMENT CO., INC., *EST CONCORD, MASS.
(*PLASMA PHYSICS, FEASIBILITY STUDIES AND INSTRUMENTATION, *BETATRONS,) (ENERGY, DENSITY, EXPERIMENTAL DATA,) (VACUUM SYSTEMS, *PARTICLE ACCELERATORS, CAPACITORS,)

*BIBLIOGRAPHY

AD-272 565 62-2-4 DIV. 25
ARNOLD ENGINEERING DEVELOPMENT CENTER, ARNOLD AIR FORCE STATION, TENN.
(HANDBOOKS OF *PHYSICAL PROPERTIES, MEASUREMENT,) *TABLES, *BIBLIOGRAPHY

AD-272 581 62-2-4 DIV. 16
NAVAL SCHOOL OF AVIATION MEDICINE, PENSACOLA, FLA.
(*BIBLIOGRAPHY, *ASTRONAUTICS, *SPACE MEDICINE, *SPACE FLIGHT, SPACE CAPSULES, WEIGHTLESSNESS, BALLOONS, MANNED, COSMIC RAYS, MAN, LABORATORY ANIMALS,) SCIENTIFIC RESEARCH,

AD-272 592 62-2-4 DIV. 14
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS., ARMY CHEMICAL CENTER, MD.
(*MATERIALS, *ORGANIC MATERIAS, *CERAMIC MATERIALS, INORGANIC SUBSTANCES, *FIBERS, PRODUCTION, SYNTHESIS, MANUFACTURING METHODS,) (METALORGANIC COMPOUNDS, *POLYMER, *PLASTICS, HEAT RESISTANT POLYMERS, RESINS, LAMINATES, COATINGS, ADHESIVES,) (*SYNTHETIC FIBERS, TEXTILES,) (METALS, ALLOYS,) (TOXICITY, HAZARDS,) (RADIATION EFFECTS, SPACE ENVIRONMENTAL CONDITIONS, GUIDED MISSILES,) SOLID ROCKET PROPELLANTS, *BIBLIOGRAPHY,

AD-272 645 62-2-4 DIV. 2
ARCTIC INST. OF NORTH AMERICA. WASHINGTON. D.C.
(•TERRAIN. ANALYSIS OF •ARCTIC REGIONS.) (ENGINEERING. PHYSICAL PROPERTIESOF •ICE.) (•RESEARCH PROGRAM ADMINISTRATION IN OCEANOGRAPHY. METEOROLOGY. GEOLOGY. THERMAL RADIATION. MARINE BIOLOGY. GLACIERS AND GEOPHYSICS.) •BIBLIOGRAPHY.

AD-272 650 62-2-4 DIV. 3
NAVAL BIOLOGICAL LAB.. U. OF CALIF.. OAKLAND.
(•MEDICAL RESEARCH. •SCIENTIFIC REPORTS.) (COCCIDIOIDES. IMMUNOLOGY.) •BIBLIOGRAPHY. •AEROBIOLOGY. PASTEURELLA. VIRUS DISEASES. EPIDEMIOLOGY. BIOPHYSICS. MEDICAL EQUIPMENT.

AD-272 687 62-2-4 DIV. 23
NAVAL PERSONNEL RESEARCH FIELD ACTIVITY. SAN DIEGO. CALIF.
(•BIBLIOGRAPHY. •READING. EDUCATION. TRAINING.)

AD-272 693 62-2-4 DIV. 17
DEPARTMENT OF THE ARMY. WASH.. D. C.
(•BIBLIOGRAPHY. •METALS. •EXPLOSIVE FORMING. SAFETY DEVICES. •ALLOYS REFRACTORY MATERIALS. HARDENING. •WELDING. •MACHINING. THEORY. GAS IONIZATION. HEAT TRANSFER. SHOCK WAVES.)

AD-272 797 62-2-4 DIV. 20
LOCKHEED AIRCRAFT CORP.. SUNNYVALE. CALIF.
(•SCATTERING. •TRANSPORT PROPERTIES. DIFFERENTIAL CROSS SECTION. •ATOMS. •IONS. ELECTRONS.) (NUCLEAR ENERGY. NUCLEAR REACTIONS. THERMONUCLEAR REACTIONS.) •BIBLIOGRAPHY.

AD-272 830 62-2-4 DIV. 12
LINCOLN LAB.. MASS. INST. OF TECH.. LEXINGTON.
(•SATELLITE VEHICLES. SPACE FLIGHT. •MOTION. ORBITAL FLIGHT PATHS.) (PERTURBATION THEORY. AERODYNAMICS. DRAG. TERRESTRIAL MAGNETISM. MAGNETIC FIELDS. GRAVITY. METEORITES. HAZARDS. TORQUE.) •BIBLIOGRAPHY.

AD-272 831 62-2-4 DIV. 2
ELECTRO-MECHANICS CO.. AUSTIN. TEX.
(•MAGNETIC FIELDS. •PLANETARY ATMOSPHERES. INTERSTELLAR MATTER. •SPACE PROBES. SOLAR ATMOSPHERE. SOLAR CORONA. •TERRESTRIAL MAGNETISM. SOLAR NOISE.) (•MAGNETOHYDRODYNAMICS. SHOCK WAVES. PLASMA PHYSICS.) (INSTRUMENTATION. TESTS. RELIABILITY. MAGNETOMETERS. TELEMETER SYSTEMS. COMMUNICATIONS THEORY.) •BIBLIOGRAPHY.

AD-272 841 62-2-4 DIV. 25
LOCKHEED AIRCRAFT CORP.. SUNNYVALE. CALIF.
(•BIBLIOGRAPHY AND ABSTRACTIN OF •PLASMA PHYSICS. •ELECTROMAGNETIC WAVES. WAVE TRANSMISSION. MICROWAVES.) (THEORY. EXPERIMENTAL DATA AND FEASIBILITY STUDIES.)

AD-272 852 62-2-4 DIV. 30
AMERICAN MACHINE AND FOUNDRY CO.. NILES. ILL.
(•METAL FORMING PRESSES. •EXTRUSION. •CONTAINERS. CYLINDRICAL BODIES. FAILURE (MECHANICS). •NON-DESTRUCTIVE TESTING. ULTRASONICS. RADIOGRAPHY. SURFACES. ELECTROMAGNETIC FIELDS. MAGNETIC FIELDS. ELECTROMAGNETISM. FEASIBILITY STUDIES.) •BIBLIOGRAPHY.

•BLACKBODY RADIATION

AD-272 614 62-2-4 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WASHINGTON. D. C.
(•REFRACTORY MATERIALS. OXIDES. CHROMIUM COMPOUNDS. ALUMINUM COMPOUNDS.) (•CERAMIC MATERIALS. •CERMETS. SILICON COMPOUNDS. CARBIDES. NITRIDES. CHROMIUM COMPOUNDS. ALUMINUM COMPOUNDS. OXIDES. •FLAME SPRAYING.) (•HEAT RESISTANT ALLOYS. NICKEL ALLOYS. CHROMIUM ALLOYS. IRON ALLOYS.) (HIGH TEMPERATURE RESEARCH. MEASUREMENT OF •BLACKBODY RADIATION.) (TEMPERATURE CONTROL. SUPERSONC PLANES. HYPERSONICS.) •HEAT RESISTANT PAINTS.

AD-272 888 62-2-4 DIV. 17
CHANCE VOUGHT CORP.. DALLAS. TEX.
(•ALUMINUM ALLOYS. FATIGUE (MECHANICS). STRESSES. CORROSION.) (NIOBIUM ALLOYS. DIFFUSION OF •CERAMIC COATINGS AS OXIDATION INHIBITORS.) (MAGNESIUM ALLOYS. CASTINGS. MECHANICAL PROPERTIES.) (HYDRAULIC SYSTEMS. METAL SEALS. •ALLOYS.) (NICKEL ALLOYS. SHEETS. •HEAT RESISTANT ALLOYS.) (•BLACKBODY RADIATION. ZIRCONIUM COMPOUNDS. OXIDES.) (•PHOTOELASTIC MATERIALS. COATINGS.) (•GLASS TEXTILES. AIRCRAFT CANOPIES.)

•BLAST

AD-272 596 62-2-4 DIV. 22
BROADVIEW RESEARCH CORP.. BURLINGAME. CALIF.
(RDX. •EXPLOSIONS. •BLAST. •SHOCK WAVES. •PRESSURE. MEASUREMENT. PRESSURE GAGES. TERRAIN. CONFIGURATION. TERRAIN MODELS. MODEL TESTS. TEST EQUIPMENT.) (•NUCLEAR EXPLOSIONS. SIMULATION.)

AD-272 936 62-2-4 DIV. 25
ILLINOIS U.. URBANA.
(•LOAD DISTRIBUTION. LOADING OF HEMISPHERICAL SHELLS AND •STRUCTURAL SHELLS BY •BLAST AND SHOCK WAVES.) (STRESSES. ELASTICITY. MATHEMATICAL ANALYSIS.)

•BLUNT BODIES

AD-272 661 62-2-4 DIV. 9
ARMY ORDNANCE MISSILE COMMAND (REDSTONE ARSENAL. HUNTSVILLE. ALA.)
(NUMERICAL ANALYSIS FOR DETERMINATION OF •SUPERSONIC FLOW AROUND •BLUNT BODIES WITH SUPERSONIC FLOW AT CHEMICAL EQUILIBRIUM.)

•BODIES OF REVOLUTION

AD-272 908 62-2-4 DIV. 9
AEROSPACE CORP.. LOS ANGELES. CALIF.
(•AIRFOILS. •RINGS. •BODIES OF REVOLUTION. •FUSELAGES. •AIRPLANE PANELS. AERODYNAMICS. TRANSONICS. SUPERSONICS. HYPERSONICS. DOWNWASH. ELASTICITY. LIFT. PRESSURE. GUST LOADS. TRANSIENTS. MATHEMATICAL ANALYSIS. INTEGRAL EQUATIONS. DIFFERENTIAL EQUATIONS. PARTIAL DIFFERENTIAL EQUATIONS. MATRIX ALGEBRA.) VISCOSITY. SHOCK WAVES. VORTICES. INTERFERENCE.

AD-272 974 62-2-4 DIV. 9
THERM. INC.. ITHACA. N. Y.
(•HYDRODYNAMICS. AXIALLY SYMMETRIC FLOW. FLUID FLOW PAST •BODIES OF REVOLUTION.) (BOUNDARY LAYER. MOTION. PRESSURE. VELOCITY.) (PERTURBATION THEORY. DISTRIBUTION THEORY. FUNCTIONS.)

•BOMB FUZES

AD-272 678 62-2-4 DIV. 22
HARVEY ALUMINUM SALES. INC.. TORRANCE. CALIF.
(•BOMB FUZES. •NOSE FUZES. TAIL FUZES. TIME DELAY FUZES. IMPACT FUZES. FUZES. DESIGN. PRODUCTION. TESTS.)

•BOOSTER ROCKETS

AD-272 960 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WASHINGTON. D. C.
(LIQUID ROCKET PROPELLANTS. •BOOSTER ROCKETS. ENGINE CLUSTERS. ROCKET MOTOR NOZZLES. •EXHAUST GASES. AERODYNAMICS GAS FLOW. PRESSURE. MEASUREMENT.)

•BORON ALLOYS

AD-272 635 62-2-4 DIV. 25
STRASBOURG U. (FRANCE).
(•IRON COMPOUNDS. •COBALT COMPOUNDS. BORIDES. •PHOSPHIDES. SYNTHESIS.) (ALLOYS. •BORON ALLOYS. TRANSITION ELEMENTS. IRON ALLOYS. COBALT ALLOYS. NICKEL ALLOYS. MANGANESE ALLOYS. •PHOSPHORUS ALLOYS.) (FERROMAGNETISM. •FERROMAGNETIC MATERIALS. FERROELECTRIC CRYSTALS. PARAMAGNETIC CRYSTALS. MAGNETIC PROPERTIES. ANTIFERROMAGNETISM. THERMODYNAMICS.) FRANCE.

•BRAZING

AD-272 907 62-2-4 DIV. 17
SOLAR AIRCRAFT CO.. SAN DIEGO. CALIF.
(REFRACTORY MATERIALS. •TUNGSTEN. •BRAZING. SILVER SOLDERS.) (SOLDERING ALLOYS. PLATINUM ALLOYS. BORON ALLOYS. ADDITIVES. POWDER METALS. TUNGSTEN.) (METAL JOINTS. WELDO JOINTS. DIFFUSION. HEAT TREATMENT. THICKNESS.) (TUNGSTEN COMPOUNDS. BORIDES. ADDITIVES. FOILS. TITANIUM. ZIRCONIUM. TESTS. SHEAR STRESSES. X -RAY DIFFRACTION ANALYSIS.)

•CALORIMETERS

AD-272 639 62-2-4 DIV. 17
BIRMINGHAM U. (GT. BRIT.).
(ALLOYS. •TIN ALLOYS. •LIQUID METALS. PHASE STUDIES. PHASE TRANSITIONS. ENTHALPY. •THERMODYNAMICS. •CALORIMETERS. LABORATORY EQUIPMENT. DESIGN.) GREAT BRITAIN.

•CANTILEVER BEAMS

AD-272 648 62-2-4 DIV. 25
BROWN U. DIV. OF APPLIED MATHEMATICS. PROVIDENCE. R. I.
(•CANTILEVER BEAMS. LOADING. LOAD DISTRIBUTION. •DEFORMATION. •PLASTICIT.) (STRESSES. MATHEMATICAL ANALYSIS.)

•CARBON COMPOUNDS

AD-272 881 62-2-4 DIV. 4
THOMPSON RAMO •OOLDRIDGE. INC.. CLEVELAND. OHIO.
(SUBMARINES. CONTROLLED ATMOSPHERES. •OXIDATION-REDUCTION REACTIONS REDUCTION. CHEMICAL REACTIONS. •CARBON DIOXIDE. •CARBON COMPOUNDS. •MONOXIDES. HYDROGEN. CATALYSTS. CARBON DEPOSITS. TEMPERATURE. GASES. MOISTURE.) (CATALYSIS. ELECTROLYSIS. CHEMICAL EQUILIBRIUM. REACTION KINETICS. THERMOCHEMISTRY. THERMODYNAMICS.)

•CARBON DIOXIDE

AD-272 816 62-2-4 DIV. 25
GENERAL DYNAMICS/ASTRONAUTICS. SAN DIEGO. CALF.
(•INFRARED RADIATION IN •CARBON DIOXIDE. •INFRARED SPECTROSCOPY. FLAMES.) (TEMPERATURE. PRESSURE. OPTICS.) (HARMONIC OSCILLATORS. VIBRATION.) (FUNCTIONS. POTENTIAL THEORY.)

AD-272 868 62-2-4 DIV. 25
APPLIED PHYSICS LAB.. JOHNS HOPKINS U.. SILVER SPRING. MD.
(•NITROGEN. •CARBON DIOXIDE. MIXTURES. GASES. HIGH TEMPERATURE RESEARCH. •THERMAL CONDUCTIVITY. THERMODYNAMICS. GAS FLOW. THEORY. TEST METHODS.)

AD-272 881 62-2-4 DIV. 4
THOMPSON RAMO •OOLDRIDGE. INC.. CLEVELAND. OHIO.
(SUBMARINES. CONTROLLED ATMOSPHERES. •OXIDATION-REDUCTION REACTIONS REDUCTION. CHEMICAL REACTIONS. •CARBON DIOXIDE. •CARBON COMPOUNDS. •MONOXIDES. HYDROGEN. CATALYSTS. CARBON DEPOSITS. TEMPERATURE. GASES. MOISTURE.) (CATALYSIS. ELECTROLYSIS. CHEMICAL EQUILIBRIUM. REACTION KINETICS. THERMOCHEMISTRY. THERMODYNAMICS.)

AD-272 919 62-2-4 DIV. 16
MINNEAPOLIS-HONEYWELL REGULATOR CO.. MINN.
(•CLOSED CYCLE ECOLOGICAL SYSEMS. •CARBON DIOXIDE. •ADSORPTION. POROUS FILTERS.) SPACE MEDICINE.

•CARBONYL RADICALS

AD-272 949 62-2-4 DIV. 4
AEROSPACE CORP.. LOS ANGELES. CALIF.
(•CARBONYL RADICALS AND •METAL-ORGANIC COMPOUNDS OF TRANSITION ELEMENTS. •HALOCARBONS. SYNTHESIS. CHEMICAL REACTIONS. METALATION. DISPLACEMENT REACTIONS. REDUCTION. GRIGNARD REACTIONS.) (POLYCYCLIC COMPOUNDS. PENTANES. CARBONYL RADICALS AND METALORGANIC COMPOUNDS OR NITROSO RADICALS OR SALTS OR HALIDES OR ALKYL RADICALS OR PHENYL RADICALS OR ANTIMONY COMPOUNDS AND HYDRIDES OR NITRILES OR PHOSPHINES OR ARSINES OR CYANO RADICALS.)

•CARGO SHIPS

AD-272 885 62-2-4 DIV. 31
DAVID TAYLOR MODEL BASIN. WASHINGTON. D. C.
(•NAVAL VESSELS FOR LAUNCHING. •GUIDED MISSILES. •SHIP HULLS. VIBRATION. TESTS.) (•CARGO SHIPS. •MERCHANT VESSELS. SHIP HULLS. VIBRATION. TESTS.)

•CATHODES (ELECTRON TUBES)

AD-272 760 62-2-4 DIV. 8
LINFIELD RESEARCH INST.. MCMINNVILLE. OREG.
(•CATHODES (ELECTRON TUBES). •FIELD EMISSION. MEASUREMENT. THEORY.) (COLD CATHODE TUBES. ELECTRON TUBES. TETRODES. MICROWAVE EQUIPMENT. ELECTRON OPTICS. TUNGSTEN. MATERIALS. STABILITY. ELECTROLYTIC POLISHING. DESIGN. SURFACE PROPERTIES. CRYSTAL STRUCTURE. ELECTRICAL PROPERTIES. MEASUREMENT.) (VACUUM SYSTEMS. ALUMINUM COMPOUNDS. SILICATES. GLASS. ELECTRON TUBES.)

•CAVITATION

AD-272 903 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WASHINGTON. D.C.
(•CAVITATION. RELIABILITY. TESTS OF •ROTOR BLADES. •FLUID FLOW. HYDRODYNAMICS. WATER.) (INSTRUMENTATION. VACUUM PUMPS. HET EXCHANGERS. VENTURI TUBES. TRANSDUCERS.) (CENTRIFUGAL PUMPS. VAPOR PRESSURE.) PHOTOGRAPHIC ANALYSIS.

•CELESTIAL MECHANICS

AD-272 859 62-2-4 DIV. 30
AIR FORCE SPECIAL WEAPONS CENTER. KIRTLAND AIR FORCE BASE. N. MEX.
(•PROGRAMMING. •COMPUTERS. •SPACE PROBES. BOOSTER ROCKETS. •ORBITAL FLIGHT PATHS. VELOCITY.) (GEODESICS. •CELESTIAL MECHANICS. TIME. AZIMUTH. CELESTIAL NAVIGATION. PERTURBATION THEORY. GRAVITY.)

•CELESTIAL NAVIGATION

AD-272 955 62-2-4 DIV. 12
LABORATORIES FOR RESEARCH AND DEVELOPMENT. FRANKLIN INST.. PHILADELPHIA. PA.
(•SPACE NAVIGATION. •CELESTIAL NAVIGATION. ELECTROMAGNETIC WAVES. OPTICAL

SYSTEMS. DOPPLER SYSTEMS. STARS. LIGHT TRANSMISSION. SPECTROGRAPHIC ANALYSIS.) (•INTERFEROMETERS. TEMPLATES. LIGHT. SOURCES. INTESITY. SENSITIVITY. TESTS. SIGNAL-TO-NOISE RATIO.)

•CERAMIC COATINGS

AD-272 888 62-2-4 DIV. 17
CHANCE VOUGHT CORP., DALLAS, TEX.
(•ALUMINUM ALLOYS. FATIGUE (MECHANICS). STRESSES. CORROSION.) (NIOBIUM ALLOYS. DIFFUSION OF •CERAMIC COATINGS AS OXIDATION INHIBITORS.) (MAGNESIUM ALLOYS. CASTINGS. MECHANICAL PROPERTIES.) (HYDRAULIC SYSTEMS. METAL SEALS. •ALLOYS.) (NICKEL ALLOYS. SHEETS. •HEAT RESISTANT ALLOYS.) (•BLACKBODY RADIATION. ZIRCONIUM COMPOUNDS. OXIDES.) (•PHOTOELASTIC MATERIALS. COATINGS.) (•GLASS TEXTILES. AIRCRAFT CANOPIES.)

•CERAMIC FIBERS

AD-272 788 62-2-4 DIV. 16
BJORKSTEN RESEARCH LABS., INC., MADISON, WIS.
(•REFRACTORY MATERIALS. •CERAMIC FIBERS. THERMAL INSULATION. FIBERS.) (•SILICON COMPOUNDS. •DIOXIDES. ADDITIVES. CHROMIUM COMPOUNDS. OXIDES. MOLYBDENUM COMPOUNDS. SILICIDES. COPPER.) (TESTS. VISCOSITY. DETERMINATION BY DEFORMATION. RODS. FIBERS. ABLATION. RESISTANCCE. BLACKBODY RADIATION.) GUIDED MISSILE NOSES. ROCKET MOTOR NOZZLES. PLASTICS. REINFORCING MATERIALS.

•CERAMIC MATERIALS

AD-272 592 62-2-4 DIV. 14
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS.,
ARMY CHEMICAL CENTER, MD.
(•MATERIALS. •ORGANIC MATERIAS. •CERAMIC MATERIALS. INORGANIC SUBSTANCES. •FIBERS. PRODUCTION. SYNTHESIS. MANUFACTURING METHODS.) (METALORGANIC COMPOUNDS. •POLYMER. •PLASTICS. HEAT RESISTANT POLYMERS. RESINS. LAMINATES. COATINGS. ADHESIVES.) (•SYNTHEYIC FIBERS. TEXTILES.) (METALS. ALLOYS.) (TOXICITY. HAZARDS.) (RADIATION EFFECTS. SPACE ENVIRONMENTAL CONDITIONS. GUIDED MISSILES.) SOLID ROCKET PROPELLANTS. •BIBLIOGRAPHY.

AD-272 614 62-2-4 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(•REFRACTORY MATERIALS. OXIDES. CHROMIUM COMPOUNDS. ALUMINUM COMPOUNDS.) (•CERAMIC MATERIALS. •CERMETS. SILICON COMPOUNDS. CARBIDES. NITRIDES. CHROMIUM COMPOUNDS. ALUMINUM COMPOUNDS. OXIDES. •FLAME SPRAYING.) (•HEAT RESISTANT ALLOYS. NICKEL ALLOYS. CHROMIUM ALLOYS. IRON ALLOYS.) (HIGH TEMPEATURE RESEARCH. MEASUREMENT OF •BLACKBODY RADIATION.) (TEMPERATURE CONTROL. SUPERSONC PLANES. HYPERSONICS.) •HEAT RESISTANT PAINTS.

AD-272 835 62-2-4 DIV. 25
CINCINNATI U., OHIO.
(•CERAMIC MATERIALS. •REFRACTORY MATERIALS. •THERMODYNAMICS. HIGH TEMPERATUR RESEARCH. CRYSTALS. LATTICES.) (ELECTROLYTC CELLS. IRON COMPOUNDS. OXIDES. ELECTRIC POTENTIAL.) (•CHROMIUM COMPOUNDS AND •ZIRCONIUM COMPOUNDS. •OXIDES.) (CHROMIUM ALLOYS. NICKEL ALLOYS.) (THEORY. •PHASE STUDIES. X-RAY DIFFRACTION ANALYSIS. METALLURGICAL ANALYSIS.)

•CERMETS

AD-272 533 62-2-4 DIV. 25
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•THERMODYNAMICS. •CERMETS. •REFRACTORY MATERIALS. HIGH TEMPERATURE RESEARCH.) (MEASUREMENT. THERMAL DIFFUSION. HEAT TRANSFER. THERMAL CONDUCTIVITY. SPECIFIC HEAT. RINGS. •EDGES. CYLINDRICAL BODIES.) (GALVANOMETERS. OPTICAL INSTRUMENTS. PYROMETERS.) PHYSICAL PROPERTIES.

AD-272 614 62-2-4 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(•REFRACTORY MATERIALS. OXIDES. CHROMIUM COMPOUNDS. ALUMINUM COMPOUNDS.) (•CERAMIC MATERIALS. •CERMETS. SILICON COMPOUNDS. CARBIDES. NITRIDES. CHROMIUM COMPOUNDS. ALUMINUM COMPOUNDS. OXIDES. •FLAME SPRAYING.) (•HEAT RESISTANT ALLOYS. NICKEL ALLOYS. CHROMIUM ALLOYS. IRON ALLOYS.) (HIGH TEMPEATURE RESEARCH. MEASUREMENT OF •BLACKBODY RADIATION.) (TEMPERATURE CONTROL. SUPERSONC PLANES. HYPERSONICS.) •HEAT RESISTANT PAINTS.

•CESIUM

AD-272 752 62-2-4 DIV. 7
GENERAL ATOMIC DIV., GENERAL DYNAMICS CORP., SAN DIEGO, CALIF.
(•POWER SUPPLIES FROM •THERMIONIC EMISSION. •CESIUM VAPORS.) (CATHODES. URANIUM COMPOUNDS. ZIRCONIUM COMPOUNDS. CARBIDES. ANODES. COPPER.) (TEMPERATURE. MEASUREMENT. IONS. ELECTRICITY. PRODUCTION.) THEORY. DESIGN. DIODES. THERMOELECTRICITY.

•CHLORATES

AD-272 580 62-2-4 DIV. 3
NAVAL RESEARCH LAB., WASHINGTON, D. C.
(•PYROTECHNICS. •SODIUM COMPOUNDS. •CHLORATES. FIBERS. METALLIC TEXTILS. GLASS TEXTILES. BINDERS. POWDER METALS. IRON. BARIUM COMPOUNDS. DIOXIDES. MANUFACTURING METHODS. HIGH PRESSURE RESEARCH. DENSITY. MOLDING.) (OXYGEN. PRODUCTION. SUBMARINES.) (DECOMPOSITION. CHEMICAL REACTIONS. COMBUSTION.)

•CHROMIUM COMPOUNDS

AD-272 835 62-2-4 DIV. 25
CINCINNATI U., OHIO.
(•CERAMIC MATERIALS. •REFRACTORY MATERIALS. •THERMODYNAMICS. HIGH TEMPERATUR RESEARCH. CRYSTALS. LATTICES.) (ELECTROLYTC CELLS. IRON COMPOUNDS. OXIDES. ELECTRIC POTENTIAL.) (•CHROMIUM COMPOUNDS AND •ZIRCONIUM COMPOUNDS. •OXIDES.) (CHROMIUM ALLOYS. NICKEL ALLOYS.) (THEORY. •PHASE STUDIES. X-RAY DIFFRACTION ANALYSIS. METALLURGICAL ANALYSIS.)

•CLASSIFICATION

AD-272 820 62-2-4 DIV. 32
JONKER BUSINESS MACHINES, INC., GAITHERSBURG, MD.
(•INDEXES. THEORY. •CODING. •CLASSIFICATION. DOCUMENTATION. •LIBRARY SCIENCE. LANGUAGE.) DATA PROCESSING SYSTEMS.

•CLAYS

AD-272 681 62-2-4 DIV. 22
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
(•UNDERGROUND EXPLOSIONS. BLAST. •CRATERING. •SAND. •CLAYS. TESTS. TEST METHODS.) (SAND. CLAYS. PARTICLES. ACCELERATION. MEASUREMENT.)

•CLOSED-CYCLE ECOLOGICAL SYSTEMS

AD-272 919 62-2-4 DIV. 16
MINNEAPOLIS-HONEYWELL REGULATOR CO., MINN.
(•CLOSED CYCLE ECOLOGICAL SYSEMS. •CARBON DIOXIDE. •ADSORPTION. POROUS FILTERS.) SPACE MEDICINE.

•CLOUDS

AD-272 632 62-2-4 DIV. 24
HOWELL, W. E., ASSOCIATES, INC., LEXINGTON, MASS.
(•METEOROLOGY. •PHOTOGRAPHIC ANALYSIS OF •CLOUDS USING AERIAL CAMERAS. SURFACE TO AIR. CAMERA MOUNTS. STEREOSCOPES. MAPPING. EFFECTIVENESS. ERRORS FOR WIND. ATMOSPHERE. MOTION. SHEAR STRESSES. TESTS.)

•COATINGS

AD-272 526 62-2-4 DIV. 26
MCDONNELL AIRCRAFT CORP., ST. LOUIS, MO.
(•MOLYBDENUM ALLOYS. TITANIUM ALLOYS. ZIRCONIUM ALLOYS. SHEETS. •NIOBIUM. RIVETS. BOLTS. NUTS (MECHANICS)). (METAL JOINTS. BOLTED JOINTS. RIVETED JOINTS. •COATINS. METAL COATINGS. ANTIOXIDANTS. SILICON COATINGS. REFRACTORY COATINGS. ALUMINUM COATINGS. CHROMIUM COMPOUNDS. NIOBIUM. MOLYBDENUM.) (TEMPLATES. CHEMICAL MILLING. FORGING.) (HIGH TEMPERATURE RESEARCH. STRUCTURES. SPACESHIPS. AIRFRAMES. DESIGN.)

AD-272 619 62-2-4 DIV. 22
ORDNANCE MISSION, WHITE SANDS MISSILE RANGE, N. MEX.
(SIMULATION OF •STRESSES. ANALYSIS ON •ROCKET LAUNCHERS DURING TRANSPRTATION OVER ROADS.) (ROCKET LAUNCHERS. STRUCTURES. •COATINGS. FATIGUE (MECHANICS). STRAIN GAGES. CALIBRATION. TESTS.) ROCKETS. SURFACE TO SURFACE.

AD-272 761 62-2-4 DIV. 14
NEW YORK U. COLL. OF ENGINEERING, N. Y.
(•HEAT RESISTANT POLYMERS. POYMERS. •METALORGANIC COMPOUNDS. RESINS. •EPOXY RESINS. •COATINGS. PIGMENTS. ADDITIVES. SYNTHESIS. HIGH TEMPERATURE RESEARCH. STABILITY. PYROLYSIS. DETERIORATION.) (COMPLEX COMPOUNDS. PROPYL RADICALS. •TITANATES. VINYL RADICALS. CYCLOHEXENES. DIOXIDES. TITANIUM COMPOUNDS. ZINC COMPOUNDS. ALUMINUM COMPOUNDS. SILICONES.) (STEEL. PLASTIC COATINGS.

•COAXIAL CABLES

AD-272 534 62-2-4 DIV. 8
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•PHASE SHIFTERS. ULTRA HIGH FREQUENCY. FERRITES. MAGNETIC FIELDS. USSR.) (TRANSMISSION LINES. •MICROWAVE EQUIPMENT. •FERRITE CORES. •COAXIAL CABLES. HELIXES. DIELECTRICS. ATTENUATION. RADIO SIGNALS. RADIO TRANSMITTERS. RADIO RECEIVERS. MEASUREMENT.)

•COBALT COMPOUNDS

AD-272 635 62-2-4 DIV. 25
STRASBOURG U. (FRANCE).
(•IRON COMPOUNDS. •COBALT COMPOUNDS. BORIDES. •PHOSPHIDES. SYNTHESIS.) (ALLOYS. •BORON ALLOYS. TRANSITION ELEMENTS. IRON ALLOYS. COBALT ALLOYS. NICKEL ALLOYS. MANGANESE ALLOYS. •PHOSPHORUS ALLOYS.) (FERROMAGNETISM. •FERROMAGNETIC MATERIALS. FERROELECTRIC CRYSTALS. PARAMAGNETIC CRYSTALS. MAGNETIC PROPERTIES. ANTIFERROMAGNETISM. THERMODYNAMICS.) FRANCE.

•CODING

AD-272 936 62-2-4 DIV. 8
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(INSTRUMENTATION FOR •INFORMATION THEORY. SIMULATION AND •CODING. •INVENTIONS.) (SERVOMECHANISMS. PULSE GENERATORS ELECTRICAL NETWORKS. TRANSDUCERS. OSCILLATORS.) USSR.

AD-272 820 62-2-4 DIV. 32
JONKER BUSINESS MACHINES, INC., GAITHERSBURG, MD.
(•INDEXES. THEORY. •CODING. •CLASSIFICATION. DOCUMENTATION. •LIBRARY SCIENCE. LANGUAGE.) DATA PROCESSING SYSTEMS.

•COLLECTING METHODS

AD-272 994 62-2-4 DIV. 2
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
(•METEORITES. •COLLECTING METHODS. •SOUNDING ROCKETS.)

•COLOR VISION

AD-272 774 62-2-4 DIV. 16
RUTGERS U., NEW BRUNSWICK, N. J.
(•RETINA. •COLOR VISION. RECORDING DEVICES.) (•EYE. PHYSIOLOGY. SENSITIVITY. STIMULATION. VISUAL THRESHOLD. MONOCHROMATIC LIGHT.) (•OPTICAL IMAGES. MEASUREMENT.)

•COMBAT INFORMATION CENTERS

AD-272 913 62-2-4 DIV. 31
ELECTRIC BOAT DIV., GENERAL DYNAMICS CORP., GROTON, CONN.
(CONTROL. •CONTROL SYSTEMS IN •SUBMARINES CARRYING UNDERWATER TO SURFACE-GUIDED MISSILES.) (SHIPBORNE. DATA PROCESSING SYSTEMS. DIGITAL SYSTEMS.) (REDUCTION OF COSTS BY REDUCTION OF SUBMARINE PERSONNEL.) •DISPLAY SYSTEMS. •COMBAT INFORMATION CENTERS. CONTROL PANELS. SHIPBORNE. HUMAN ENGINEERING.

•COMBUSTION

AD-272 617 62-2-4 DIV. 10
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(•COMBUSTION OF LIQUEFIED GASES. HYDROGEN. OXYGEN. COMBUSTION CHAMBERS. ROCKET MOTORS.) (COMBUSTION CHAMBER GASES. EXHAUST GASES. •JET ACOUSTIC OSCILLATIONS. SOUND. ACOUSTICS. VELOCITY. EFFECTIVENESS. MEASUREMENT. DETERMINATION.)

•COMMAND SYSTEMS

AD-272 957 62-2-4 DIV. 5
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(•COMMAND SYSTEMS. ANALYSIS. COMMUNICATION SYSTEMS.) (SATELLITE VEHICLES. •TRACKING.) (•DIGITAL COMPUTERS. •MATHEMATICAL LOGIC. DATA TRANSMISSION SYSTEMS. MASERS. OPTICS. SOLID STATE PHYSICS. IMAGE CONVERTER TUBES.)

•COMMUNICATION EQUIPMENT

AD-272 597 62-2-4 DIV. 5
ITT KELLOGG, CHICAGO, ILL.
(•GUIDED MISSILES. SURFACE TO SURFACE. •COMMUNICATION SYSTEMS. •COMMUNICATION EQUIPMENT. INSTALLATION IN MILITARY FACILITIES. QUALITY CONTROL. SCHEDULING. GROUND SUPPORT EQUIPMENT.)

•COMMUNICATION SYSTEMS

AD-272 597 62-2-4 DIV. 5
ITT KELLOGG, CHICAGO, ILL.
(•GUIDED MISSILES. SURFACE TO

SURFACE. *COMMUNICATION SYSTEMS. *COMMUNICATION EQUIPMENT. INSTALLATION IN MILITARY FACILITIES. QUALITY CONTROL. SCHEDULING. GROUND SUPPORT EQUIPMENT.)

***COMMUTATORS**

AD-272 875 62-2-4 DIV. 7
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WASHINGTON. D. C.
(*TIME SWITCHES. *COMMUTATORS FOR *TELEMETER SYSTEMS IN *SATELLITE VEHICLES.

***COMPLEX COMPOUNDS**

AD-272 786 62-2-4 DIV. 25
WESTINGHOUSE ELECTRIC CORP.. BLOOMFIELD. N. J.
(LUMINESCENCE. *LUMINESCENT MATERIALS. LUMINESCENT PIGMENTS. *PHOSPHORS. *CRYSTAL PHOSPHORS. COLORS.) (*COMPLEX COMPOUNDS. *ZINC COMPOUNDS. *SULFIDES AND COPPER COMPOUNDS. THALLIUM COMPOUNDS. LITHIUM COMPOUNDS. IRON COMPOUNDS. IODIDES. CADMIUM COMPOUNDS. ALUMINUM COMPOUNDS. MERCURY COMPOUNDS. OXYGEN COMPOUNDS.) (PHOTOEMISSION. EXCITATION.) (DIELECTRICS. PLASTICS. IMPREGNATION. PHOSPHORS.)

***COMPUTER LOGIC**

AD-272 599 62-2-4 DIV. 30
BOEING SCIENTIFIC RESEARCH LABS.. SEATTLE. WASH.
(COMPUTERS. *COMPUTER LOGIC. DATA PROCESSING SYSTEMS.) (MATHEMATICAL COMPUTER DATA. *PROGRAMMING.)

AD-272 894 62-2-4 DIV. 28
RAND CORP.. SANTA MONICA. CALIF.
(SIMULATION OF *REASONING BY *COMPUTERS.) *BEHAVIOR. PROBABILITY. MEMORY. LEARNING. MATHEMATICAL ANALYSIS. MATHEMATICL LOGIC. CYBERNETICS. INFORMATION THEORY. *COMPUTER LOGIC. MATHEMATICAL PREDICTION.

***COMPUTERS**

AD-272 859 62-2-4 DIV. 30
AIR FORCE SPECIAL WEAPONS CENTER. KIRTLAND AIR FORCE BASE. N. MEX.
(*PROGRAMMING. *COMPUTERS. *SPACE PROBES. BOOSTER ROCKETS. *ORBITAL FLIGHT PATHS. VELOCITY.) (GEODESICS. *CELESTIAL MECHANICS. TIME. AZIMUTH. CELESTIAL NAVIGATION. PERTURBATION THEORY. GRAVITY.)

AD-272 879 62-2-4 DIV. 12
OPERATIONS ANALYSIS GROUP. OFFICE OF NAVAL OPERATIONS. WASHINGTON. D. C.
(*FIRE CONTROL COMPUTERS. *COMPUTERS. SIMULATION. INTERCEPTION PROBABILITIES. SURFACE TO AIR. *GUIDED MISSILES. AIRCRAFT.) (*ANTIAIRCRAFT DEFENSE SYSTEMS. COMPUTERS. PROGRAMMING.) (AERIAL TARGETS. INTERCEPTION.) GAMES THEORY.

AD-272 894 62-2-4 DIV. 28
RAND CORP.. SANTA MONICA. CALIF.
(SIMULATION OF *REASONING BY *COMPUTERS.) *BEHAVIOR. PROBABILITY. MEMORY. LEARNING. MATHEMATICAL ANALYSIS. MATHEMATICL LOGIC. CYBERNETICS. INFORMATION THEORY. *COMPUTER LOGIC. MATHEMATICAL PREDICTION.

***CONICAL BODIES**

AD-272 351 62-2-4 DIV. 25
ILLINOIS INST. OF TECH.. CHICAGO.
(*LOAD DISTRIBUTION AND LOADING OF *STRUCTURAL SHELLS. ELASTICITY. STRESSES. *CONICAL BODIES. BODIES OF REVOLUTION. PLASTICS.) (STRESSES. MATHEMATICAL ANALYSIS.)

AD-272 890 62-2-4 DIV. 9
GRUMMAN AIRCRAFT ENGINEERING CORP.. BETHPAGE. N. Y.
(GAS FLOW. *SUPERSONIC FLOW IN *CONICAL BODIES. *SHOCK WAVES. VELOCITY. MACH NUMBER. ANGLE-OF-ATTACK INDICATORS. (FUNCTIONS. PARTIAL DIFFERENTIAL EQUATIONS. POLYNOMINALS. NONLINEAR SYSTEMS.) USSR.

***CONTAINERS**

AD-272 587 62-2-4 DIV. 31
WOODS HOLE OCEANOGRAPHIC INSTITUTION. MASS.
(*TRANSDUCERS. *TOWED BODIES. *CONTAINERS. HOUSING. PACKAGING. TOWING CABLES. HOISTS. SHIPBORNE. LOAD DISTRIBUTION. STABILITY DESIGN. TESTS.) ECHO RANGING. *SONAR EQUIPMENT.

AD-272 852 62-2-4 DIV. 30
AMERICAN MACHINE AND FOUNDRY CO.. NILES. ILL.
(*METAL FORMING PRESSES. *EXTRUSION. *CONTAINERS. CYLINDRICAL BODIES. FAILURE (MECHANICS). *NON-DESTRUCTIVE TESTING. ULTRASONICS. RADIOGRAPHY. SURFACES. ELECTROMAGNETIC FIELDS. MAGNETIC FIELDS. ELECTROMAGNETISM. FEASIBILITY STUDIES.) *BIBLIOGRAPHY.

***CONTAMINATION**

AD-272 959 62-2-4 DIV. 20
NUCLEAR DEFENSE LAB.. ARMY CHEMICAL CENTER. MD.
(*GAMMA RAYS. *CONTAMINATION. *DOSE RATE.) (GAMMA RAYS. SIMULATION. COBALT. CESIUM. RADIOACTIVE ISOTOPES.) (INSTRUMENTATION. IONIZATION CHAMBERS. DOSIMETERS.) SHIELDING.

***CONTROL SYSTEMS**

AD-272 559 62-2-4 DIV. 12
RAND CORP.. SANTA MONICA. CALIF.
(*SPACESHIPS. THRUST. *EARTH O *MARS. FLIGHT PATHS. PROPULSION. THEORY.) (*CONTROL SYSTEMS. *NON-LINEAR DIFFERENTIAL EQUATIONS. INTEGRAL EQUATIONS. MATRIX ALGEBRA. VECTOR ANALYSIS. TRANSFORMATIONS (MATHEMATICS). INEQUALITIES.)

AD-272 699 62-2-4 DIV. 12
AMERICAN RADIATOR AND STANDARD SANITARY CORP.. MOUNTAIN VIEW. CALIF.
(SPACESHIPS. SATELLITE VEHICLES. *SATELLITE ATTITUDE. *CONTROL SYSTEMS BY JETS. DESIGN.) (WATER. WATER VAPOR. PROPANES. ROCKET FUELS. VAPOR PRESSURE. VAPORIZATION. VAPORS. JETS. EJECTION. SPECIFIC IMPULSE. THRUST.)

AD-272 913 62-2-4 DIV. 31
ELECTRIC BOAT DIV.. GENERAL DYNAMICS CORP.. GROTON. CONN.
(CONTROL. *CONTROL SYSTEMS IN *SUBMARINES CARRYING UNDERWATER TO SURFACE. GUIDED MISSILES.) (SHIPBORNE. DATA PROCESSNG SYSTEMS. DIGITAL SYSTEMS.) (REDUCTION OF COSTS BY REDUCTION OF SUBMARINE PERSONNEL.) *DISPLAY SYSTEMS. *COMBAT INFORMATION CENTERS. CONTROL PANELS. SHIPBORNE. HUMAN ENGINEERING.

***COOLING**

AD-272 562 62-2-4 DIV. 17
KECK. W. M.. LAB. OF ENGINEERING MATERIALS. CALIF. INST. OF TECH.. PASADENA.
(METALS. *IRON. HEATING. COOLING. *PHASE TRANSITIONS. TRANSITION TEMPERATURE. RELAXATION TIME. AUSTENITE. MARTENSITE. HIGH TEMPERATURE RESEARCH. THERMODYNAMICS. MATHEMATICAL ANALYSIS. INTEGRAL EQUATIONS.) (WIRE. TEST METHODS. LABORATORY EQUIPMENT. VACUUM FURNACES. ELECTRONIC CIRCUITS.)

***COPPER ALLOYS**

AD-272 561 62-2-4 DIV. 17
COLUMBIA U.. NEW YORK.
(*COPPER ALLOYS. *GOLD ALLOYS. *PHASE STUDIES. PHASE TRANSITIONS. COPPER COMPOUNDS. GOLD COMPOUNDS. *MOLECULAR ASSOCIATION. *RESISTANCE. ELECTRICAL PROPERTIES. THERMOELECTRICITY. MECHANICAL PROPERTIES. ELASTICITY. HIGH TEMPERATURE RESEARCH. THEORY.)

AD-272 858 62-2-4 DIV. 17
ARMOUR RESEARCH FOUNDATION. CHICAGO. ILL.
(*ALLOYS. *METALS WITH REINFORCING MATERIALS OF METALLIC TEXTILES.) (*ALUMINUM AND *ALUMINUM ALLOYS. *COPPER ALLOYS. POWDER ALLOYS OR POWDER METALS WITH FIBERS OF STAINLESS STEEL OR TUNGSTEN.) (POWDER METALLURGY. EXTRUSION. MECHANICAL PROPERTIES. TENSILE PROPERTIES. ELASTICITY. MICROSTRUCTURE. HARDENING.)

***COSMIC RAYS**

AD-272 581 62-2-4 DIV. 16
NAVAL SCHOOL OF AVIATION MEDICINE. PENSACOLA. FLA.
(*BIBLIOGRAPHY. *ASTRONAUTICS. *SPACE MEDICINE. *SPACE FLIGHT. SPACE CAPSULES. *WEIGHTLESSNESS. BALLOONS. MANNED. COSMIC RAYS. MAN. LABORATORY ANIMALS.) SCIENTIFIC RESEARCH.

AD-272 790 62-2-4 DIV. 25
ENRICO FERMI INST. FOR NUCLEAR STUDIES. U. OF CHICAGO. ILL.
(BALLOONS. SOLAR OBSERVATORIE.) (*COSMIC RAYS. *PROTONS. *SOLAR DISTURBANCE.)

***CRATERING**

AD-272 681 62-2-4 DIV. 22
BALLISTIC RESEARCH LABS.. ABERDEEN PROVING GROUND. MD.
(*UNDERGROUND EXPLOSIONS. BLAST. *CRATERING. *SAND. *CLAYS. TESTS. TEST METHODS.) (SAND. CLAYS. PARTICLES. ACCELERATION. MEASUREMENT.)

***CRYOGENICS**

AD-272 692 62-2-4 DIV. 30
AEROJET-GENERAL CORP.. SACRAMENTO. CALIF.
(*FLOWMETERS. LIQUID LEVEL GAGES. CALIBRATION. DESIGN. INSTRUMENTATION.) (*CRYOGENICS. LIQUID ROCKET PROPELLANTS. LIQUEFIED GASES. FLUID FLOW. VOLUME. MEASUREMENT.)

***CRYSTAL PHOSPHORS**

AD-272 786 62-2-4 DIV. 25
WESTINGHOUSE ELECTRIC CORP.. BLOOMFIELD. N. J.
(LUMINESCENCE. *LUMINESCENT MATERIALS. LUMINESCENT PIGMENTS. *PHOSPHORS. *CRYSTAL PHOSPHORS. COLORS.) (*COMPLEX COMPOUNDS. *ZINC COMPOUNDS. *SULFIDES AND COPPER COMPOUNDS. THALLIUM COMPOUNDS. LITHIUM COMPOUNDS. IRON COMPOUNDS. IODIDES. CADMIUM COMPOUNDS. ALUMINUM COMPOUNDS. MERCURY COMPOUNDS. OXYGEN COMPOUNDS.) (PHOTOEMISSION. EXCITATION.) (DIELECTRICS. PLASTICS. IMPREGNATION. PHOSPHORS.)

***CRYSTAL STRUCTURE**

AD-272 804 62-2-4 DIV. 25
DAVID SARNOFF RESEARCH CENTER. PRINCETON. N. J.
(*FERROMAGNETIC MATERIALS. SYNTHESIS. *METALLIC CRYSTALS. *CRYSTAL STRUCTURE. MAGNETIC PROPERTIES. *PHASE STUDIES. CYLINDRICAL BODIES. MAGNETIC MOMENTS. X-RAY DIFFRACTION ANALYSIS. MICROWAVE SPECTROSCOPY. MEASUREMENT.) (NICKEL COMPOUNDS. COPPER COMPOUNDS. ZINC COMPOUNDS. BARIUM COMPOUNDS LEAD COMPOUNDS. IRON COMPOUNDS. OXIDES.) (PARTICLES. SINTERING. TEMPERATURE.)

***CYLINDRICAL BODIES**

AD-272 549 62-2-4 DIV. 25
ILLINOIS INST. OF TECH.. CHICAGO.
(*CYLINDRICAL BODIES. *ROTATING STRUCTURES. ROTATION. *STRESSES. *ELASTICITY. PLASTICITY.) (STRESSES. MATHEMATICAL ANALYSIS.)

***DAMPING**

AD-272 911 62-2-4 DIV. 25
DOUGLAS AIRCRAFT CO.. INC.. EL SEGUNDO. CALIF.
(*AIRFRAMES. AIRPLANE PANELS. SHEETS. STEEL. ALUMINUM ALLOYS. VIBRATION. JET ACOUSTIC OSCILLATIONS. *DAMPING. ADHESION. VISCOSITY. ELASTICITY. ACOUSTIC INSULATION. *VIBRATION ISOLATORS. MATERIALS. COATINGS. *PLASTIC COATINGS. RUBBER COATINGS.) (POLYMERS. BUTADIENES. VINYL RADICALS. NYLON. EPOXY RESINS. POWDER METALS. ADDITIVES.) (ALUMINUM FOILS. LAMINATES. ADHESIVES.) TEST METHODS.

***DATA PROCESSING SYSTEMS**

AD-272 999 62-2-4 DIV. 30
TEXAS A. AND M. COLL.. COLLEGE STATION.
(*OCEANOGRAPHY AND *METEOROLOGY. DATA. *INSTRUMENTATION FOR OCEANOGRAPHIC DATA. METEOLOGICAL DATA.) (ELECTRONIC EQUIPMENT. DATA TRANSMISSION SYSTEMS. DATA STORAGE SYSTEMS. POWER SUPPLIES. TELEMETERING SYSTEMS. *DATA PROCESSING SYSTEMS.) (WIND. BAROMETRIC PRESSURE. OCEAN CURRENTS. TEMPERATURE.) (TRANSDUCERS. ANEMOMETERS.) *FLORIDA.

***DATA TRANSMISSION SYSTEMS**

AD-272 958 62-2-4 DIV. 5
MOTOROLA. INC.. CHICAGO. ILL.
(*DATA TRANSMISSION SYSTEMS. DIGITAL SYSTEMS. *ERRORS. MEASUREMENT.)

***DECOMPOSITION**

AD-272 988 62-2-4 DIV. 4
FELTMAN RESEARCH LABS.. PICATINNY ARSENAL. DOVER. N. J.
(*BARIUM COMPOUNDS. *AZIDES. *DECOMPOSITION. TEMPERATURE. HEATING. X RAYS. RADIATION EFFECTS. REACTION KINETICS. THEORY. MATHEMATICAL ANALYSIS.) USSR.

***DEFLECTION**

AD-272 649 62-2-4 DIV. 25
ROCK ISLAND ARSENAL LAB.. ILL.
(*BEAMS. *DEFLECTION. *LOAD DISTRIBUTIONS. SHEAR STRESSES.) (STRESSES. MATHEMATICAL ANALYSIS.)

***DEFORMATION**

AD-272 648 62-2-4 DIV. 25
BROWN U. DIV. OF APPLIED MATHEMATICS. PROVIDENCE. R. I.
(*CANTILEVER BEAMS. LOADING. LOAD DISTRIBUTION. *DEFORMATION. *PLASTICITY.) (STRESSES. MATHEMATICAL ANALYSIS.)

***DENSITY**

AD-272 892 62-2-4 DIV. 10
ROCKET PROPULSION ESTABLISHMENT (GT. BRIT.).
(*ROCKET OXIDIZERS; LIQUID ROCKET PROPELLANTS; *LIQUEFIED GASES; *OXYGEN; *DENSITY; PRESSURE; TEMPERATURE; LOW TEMPERATURE RESEARCH; THEORY; MATHEMATICAL ANALYSIS.) TABLES; GREAT BRITAIN.

***DENTAL MATERIALS**

AD-272 686 62-2-4 DIV. 10
DENTAL RESEARCH FACILITY, NAVAL TRAINING CENTER, GREAT LAKES, ILL.
(DENTAL RESEARCH; *DENTAL MATERIALS; *ZINC COMPOUNDS; *OXIDES; *PHOSPHATES; *SILVER ALLOYS; *SILICATES.)

***DETECTION**

AD-272 939 62-2-4 DIV. 6
ADVANCED ELECTRONICS CENTER, GENERAL ELECTRIC CO., ITHACA, N. Y.
(*TARGET RECOGNITION; *OPERATIONS RESEARCH; *DETECTION; FEASIBILITY STUDIES.) (SEQUENTIAL ANALYSIS; STATISTICAL PREDICTION; LINEAR SYSTEMS.) COMPUTERS, ANALYSIS; STATISTICAL TESTS; MATHEMATICAL

***DETECTORS**

AD-272 757 62-2-4 DIV. 8
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(DETERIORATION IN SIGNAL-TO-NOISE RATIO OF *RADIOFREQUENCY FILTERS; *DETECTORS.) (ERRORS IN RADIOFREQUENCY FILTERS; DETECTORS.)

AD-272 801 62-2-4 DIV. 30
RANDOLPH-MACON COLL., ASHLAND, VA.
(*ELECTROMAGNETIC FIELDS; *HAZARDS; ORDNANCE.) (*OPTICAL INSTRUMENTS; *DETECTORS; *THERMAL RADIATION.) (ELECTRIC DETONATORS; ELECTRIC IGNITERS; THERMAL RADIATION; MEASUREMENT.) (DIAPHRAGMS (MECHANICS); TESTS; TEST EQUIPMENT; MATERIALS; PNEUMATIC DEVICES.) (GLASS TEXTILES; OPTICS.)

***DETONATION**

AD-272 980 62-2-4 DIV. 10
CALIFORNIA U., BERKELEY.
(*DETONATION OF *GASES; MIXTURES OF HYDROGEN AND OXYGEN.) (GASES; *SPARK IGNITION; FLAMES; ACCELERATION.) SCHLIEREN PHOTOGRAPHY.

***DIELECTRIC FILMS**

AD-272 928 62-2-4 DIV. 25
SERVOMECHANISMS, INC., GOLETA, CALIF.
(*THIN FILMS; *DIELECTRIC FILS; METAL FILMS; MAGNETIC MATERIALS; MATERIALS; MANUFACTURING METHODS; METALLIC SMOKE DEPOSITS; NICKEL ALLOYS; IRON ALLOYS; COBALT ALLOYS; SURFACES; GLASS; PHYSICAL PROPERTIES; MAGNETIC PROPERTIES.) SOLID STATE PHYSICS.

AD-272 929 62-2-4 DIV. 25
SERVOMECHANISMS, INC., GOLETA, CALIF.
(*THIN FILMS; *DIELECTRIC FILS; MAGNETIC MATERIALS; *LUMINESCENT MATERIALS; LUMINOUS PIGMENTS; *PHOSPHORS; MATERIALS; METALLIC SMOKE DEPOSITS; ZINC COMPOUNDS; SULFIDES; CATALYSTS; POWDER METALS; MANGANESE; SURFACES; GLASS; PHOTOEMISSION; EXCITATION; ELECTRICITY.) MANUFACTURING METHODS; VACUUM APPARATUS.

***DIFFRACTION**

AD-272 751 62-2-4 DIV. 25
COLUMBIA U., NEW YORK.
(*DIFFRACTION OF *ACOUSTICS; *SHOCKWAVES AROUND WEDGES.) (WAVE TRANSMISSION; VELOCITY.) (INTEGRAL EQUATIONS; POTENTIAL THEORY.)

***DIGITAL COMPUTERS**

AD-272 570 62-2-4 DIV. 30
LAND-AIR, INC., POINT MUGU, CALIF.
(*DIGITAL COMPUTERS; *PROGRAMMING.) EXPERIMENTAL DATA.

AD-272 571 62-2-4 DIV. 30
LAND-AIR, INC., POINT MUGU, CALIF.
(*DIGITAL COMPUTERS; *PROGRAMMING.)

AD-272 798 62-2-4 DIV. 30
LAND-AIR, INC., POINT MUGU, CALIF.
(*DIGITAL COMPUTERS; *PROGRAMMING; CODING; HANDBOOKS.)

AD-272 957 62-2-4 DIV. 5
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(*COMMAND SYSTEMS; ANALYSIS; COMMUNICATION SYSTEMS.) (SATELLITE VEHICLES; *TRACKING.) (*DIGITAL COMPUTERS; *MATHEMATICAL LOGIC; DATA TRANSMISSION SYSTEMS; MASERS; OPTICS; SOLID STATE PHYSICS; IMAGE CONVERTER TUBES.)

***DIGITAL RECORDING SYSTEMS**

AD-272 750 62-2-4 DIV. 30
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS., ARMY CHEMICAL CENTER, MD.
(*PARTICLES; AEROSOLS; MEASUREMENT; ANALYSIS.) (AUTOMATIC; COLLECTING METHODS; *DIGITAL RECORDING SYSTEMS; TEST EQUIPMENT; DESIGN.)

***DIODES**

AD-272 659 62-2-4 DIV. 8
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
(NUMERICAL ANALYSIS OF HIGH FREQUENCY; *NOISE (RADIO) AT CATHODES (ELECTRON TUBES).) (NUMERICAL METHODS AND PROCEDURES FOR ANALYSIS OF NOISE (RADIO) IN *DIODES.) (DIODES; SPACE CHARGES; THERMIONIC EMISSION.)

AD-272 849 62-2-4 DIV. 8
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
(*THERMOELECTRICITY; ELECTRIC POWER PRODUCTION; POWER SUPPLIES.) (ELECTRICAL PROPERTIES; MOLYBDENUM; CESIUM; *DIODES.) (*THERMIONIC EMISSION; *PLASMA PHYSICS; CESIUM; DISCHARGE TUBES.) (THERMIONIC EMISSION; MOLYBDENUM; CATHODES (ELECTRON TUBES); EVAPORATION IN CESIUM VAPORS.) (ELECTRONS; REFLECTION FROM CESIUM; COATINGS; THIN FILMS.) (CESIUM; VAPORS; THERMAL CONDUCTIVITY.)

AD-272 887 62-2-4 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(DESIGN OF C BAND; *MICROWAVE AMPLIFIERS; *TUNED AMPLIFIERS.) (THEORY OF ULTRA HIGH FREQUENCY AMPLIFIERS.) (*DIODES USING SILICON; GALLIUM COMPOUNDS; ARSENIDES FOR USE IN C BAND; AMPLIFIERS.)

***DIOXIDES**

AD-272 788 62-2-4 DIV. 14
BJORKSTEN RESEARCH LABS., INC., MADISON, WIS.
(*REFRACTORY MATERIALS; *CERAMIC FIBERS; THERMAL INSULATION; FIBERS.) (*SILICON COMPOUNDS; *DIOXIDES; ADDITIVES; CHROMIUM COMPOUNDS; OXIDES; MOLYBDENUM COMPOUNDS; SILICIDES; COPPER.) (TESTS; VISCOSITY; DETERMINATION BY DEFORMATION; RODS; FIBERS; ABLATION; RESISTANCE; BLACKBODY RADIATION.) GUIDED MISSILE NOSES; ROCKET MOTOR NOZZLES; PLASTICS; REINFORCING MATERIALS.

***DIPOLE ANTENNAS**

AD-272 941 62-2-4 DIV. 8
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*DIPOLE ANTENNAS; BROADBAND; COUPLED ANTENNAS; IMPEDANCE MATCHING; ANTENNA CHOKES; TELEVISION ANTENNAS; ULTRA HIGH FREQUENCY; *ANTENNAS; USSR.)

***DISCHARGE TUBES**

AD-272 935 62-2-4 DIV. 25
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
(MEASUREMENT OF *MAGNETIC FIELDS IN *MAGNETIC PINCH; *DISCHARGE TUBES; NITROGEN; PLASMA PHYSICS.) (TESTS; EXPERIMENTAL DATA; PHOTOGRAPHIC ANALYSIS.) OSCILLOGRAMS; PERTURBATION THEORY.

***DISPLAY SYSTEMS**

AD-272 699 62-2-4 DIV. 6
CONTRONICS, BOSTON, MASS.
(DESIGN OF *VOLTMETERS; SHIPBORNE; *DISPLAY SYSTEMS; *ANALOG-TO-DIGITAL CONVERTERS; SEMICONDUCTORS; TRANSISTORS; DIODES.) (SUBMINIATURE ELECTRONIC EQUIPMENT; ELECTRONIC CIRCUITS; PRINTED CIRCUITS; PACKGING; TRIGGER CIRCUITS.)

AD-272 913 62-2-4 DIV. 31
ELECTRIC BOAT DIV., GENERAL DYNAMICS CORP., GROTON, CONN.
(CONTROL; *CONTROL SYSTEMS IN *SUBMARINES CARRYING UNDERWATER TO SURFACE GUIDED MISSILES.) (SHIPBORNE; DATA PROCESSNG SYSTEMS; DIGITAL SYSTEMS.) (REDUCTION OF COSTS BY REDUCTION OF SUBMARINE PERSONNEL.) *DISPLAY SYSTEMS; *COMBAT INFORMATION CENTERS; CONTROL PANELS; SHIPBORNE; HUMAN ENGINEERING.

AD-272 915 62-2-4 DIV. 28
HUMAN FACTORS RESEARCH, INC., LOS ANGELES, CALIF.
(*DISPLAY SYSTEMS; *MONITORS; AUDITORY SIGNALS; VISUAL SIGNALS; DETECTION; ATTENTION; REACTION (PSYCHOLOGY); REACTION TIME; BEHAVIOR; VISUAL PERCEPTION; AUDITORY PERCEPTION; *HUMAN ENGINEERING; THEORY.

***DISSOCIATION**

AD-272 783 62-2-4 DIV. 25
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
(*OXYGEN; *IONS; ELECTRONS; CARBON DIOXIDE; CARBON COMPOUNDS; MONOXIDES; *DISSOCIATION; PROBABILITY.)

***DOCUMENTATION**

AD-272 572 62-2-4 DIV. 32
THOMPSON RAMO WOOLDRIDGE, INC., LOS ANGELES, CALIF.
(*LIBRARY SCIENCE; *APPLIED MATHEMATICS; PROBABILITY; STATISTICAL ANALYSIS; TOPOLOGY; ALGEBRAIC TOPOLOGY; ALGEBRA; MATRIX ALGEBRA.) (*DOCUMENTATION; *INDEXES.) COMPUTERS.

***DOPPLER NAVIGATION**

AD-272 979 62-2-4 DIV. 6
BATTELLE INSTITUTE, FRANKFURT/MAIN (GERMANY).
(*SATELLITE VEHICLES; NAVIGATION; *DOPPLER TRACKING; *DOPPLER NAVIGATION; TRACKING; *RADIO STATIONS; RADIO RECEIVERS; VERY HIGH FREQUENCY; DIPOLE ANTENNAS; MAGNETIC RECORDING SYSTEMS; RADIO EQUIPMENT; INSTRUMENTATION; INSTALLATION.) GERMANY.

***DOPPLER SYSTEMS**

AD-272 628 62-2-4 DIV. 25
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(*DOPPLER SYSTEMS; MEASUREMENT OF *RAKE; IONIZATION BY ALUMINUM OR NYLON; *HYPERVELOCITY PROJECTILES FROM HYPERVELOCITY GUNS INTO STORAGE TANKS.) (ELECTRONIC EQUIPMENT; INSTRUMENTATION; *RADIOFREQUENCY SPECRUM ANALYZERS; *WAVEGUIDES; *RADIO SIGNALS; OSCILOSCOPES; PHASE SHIFTERS.) (ELECTROMAGNETIC WAVES; WAVE TRANSMISSION; THERMAL RADIATION.)

***DOPPLER TRACKING**

AD-272 971 62-2-4 DIV. 12
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
(INTERFEROMETERS; DIRECTION FINDING; ANTENNAS; DOPPLER SYSTEMS FOR *TRACKING; *SATELLITE VEHICLES.) (RADIOFREQUENCY FILTERS FOR *DOPPLER TRACKING OF SATELLITE VEHICLES.) SATELLITE VEHICLE TRAJECTORIES; ORBITAL FLIGHT PATHS.

AD-272 979 62-2-4 DIV. 6
BATTELLE INSTITUTE, FRANKFURT/MAIN (GERMANY).
(*SATELLITE VEHICLES; NAVIGATION; *DOPPLER TRACKING; *DOPPLER NAVIGATION; TRACKING; *RADIO STATIONS; RADIO RECEIVERS; VERY HIGH FREQUENCY; DIPOLE ANTENNAS; MAGNETIC RECORDING SYSTEMS; RADIO EQUIPMENT; INSTRUMENTATION; INSTALLATION.) GERMANY.

***DOSE RATE**

AD-272 959 62-2-4 DIV. 20
NUCLEAR DEFENSE LAB., ARMY CHEMICAL CENTER, MD.
(*GAMMA RAYS; *CONTAMINATION; *DOSE RATE.) (GAMMA RAYS; SIMULATION; COBALT; CESIUM; RADIOACTIVE ISOTOPES.) (INSTRUMENTATION; IONIZATION CHAMBERS; DOSIMETERS.) SHIELDING.

***DRAWING (MACHINE PROCESSING)**

AD-272 799 62-2-4 DIV. 17
LYON, INC., DETROIT, MICH.
(*DRAWING (MACHINE PROCESSING); *ROCKET CASES; AUSTENITE; *STEEL.) (PROCESSING; MANUFACTURING METHODS; ROCKET MOTORS; COMBUSTION CHAMBERS; HEAT TREATMENT; DEFORMATION; PLASTIC FLOW; PLASTICITY; HARDENING; TEMPERATURE; MECHANICAL PROPERTIES; TENSILE PROPERTIES.) (TOOLS; DIES; DESIGN.)

***DRY CELLS**

AD-272 582 62-2-4 DIV. 7
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(ALKALINE CELLS; *DRY CELLS; *ELECTROLYTIC CELLS; ELECTRODES; ELECTROLYTES; DESIGN.) (MANGANESE DIOXIDE ELECTRODES; ANODES (ELECTHOLYTIC CELL); MANGANESE COMPOUNDS; DIOXIDES; GRAPHITE; ALKALI METAL COMPOUNDS.) (CATHODES (ELECTROLYTIC CELL); ZINC.) USSR.

***EARTH**

AD-272 559 62-2-4 DIV. 12
RAND CORP., SANTA MONICA, CALIF.
(*SPACESHIPS, THRUST, *EARTH O
*MARS, FLIGHT PATHS, PROPULSION, THEORY.)
(*CONTROL SYSTEMS, *NON-LINEAR DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS, MATRIX ALGEBRA, VECTOR ANALYSIS, TRANSFORMATIONS (MATHEMATICS), INEQUALITIES.)

***ELASTIC SCATTERING**

AD-272 918 62-2-4 DIV. 20
GENERAL DYNAMICS/FORT WORTH, TEX.
(*ELASTIC SCATTERING AND *TRANSPORT PROPERTIES OF NUCLEAR REACTIONS IN WATER.) (SHIELDING, NEUTRONS, *NEUTRON FLUX DENSITY, NUCLEI, FISSION, NUCLEAR ENERGY.) (DIFFERENTIAL CROSS SECTION, DIFFERENTIAL GEOMETRY, OPERATORS (MATHEMATICS), POLYNOMIALS, FUNCTIONS.) *TABLES.

***ELASTICITY**

AD-272 549 62-2-4 DIV. 25
ILLINOIS INST. OF TECH., CHICAGO.
(*CYLINDRICAL BODIES, *ROTATING STRUCTURES, ROTATION, *STRESSES, *ELASTICITY, PLASTICITY.) (STRESSES, MATHEMATICAL ANALYSIS.)

AD-272 685 62-2-4 DIV. 25
BROWN U. DIV. OF APPLIED MATHEMATICS, PROVIDENCE, R. I.
(SOLID STATE PHYSICS, STATICS AND *ELASTICITY IN *SOLIDS, SHEAR STRESSES.) (ENERGY, *POTENTIAL THEORY, TENSOR ANALYSIS *PARTIAL DIFFERENTIAL EQUATIONS, LINEAR SYSTEMS.)

AD-272 698 62-2-4 DIV. 15
CALIFORNIA U., BERKELEY.
(*FUNCTIONS AND *POTENTIAL THEORY OF *ELASTICITY AND STRESSES.) (HARMONIC ANALYSIS, CONFORMAL MAPPING, PARTIAL DIFFERENTIAL EQUATIONS, TAYLOR'S SERIES, POLYNOMIALS, TRANSFORMATIONS (MATHEMATICS).)

***ELASTOMERS**

AD-272 671 62-2-4 DIV. 14
NAUGATUCK CHEMICAL DIV., UNITED STATES RUBBER CO., CONN.
(*ELASTOMERS, *HEAT RESISTANT POLYMERS, *VULCANIZATES, SYNTHESIS, POLYMERS, HYDROXIDES, PHENYL RADICALS, ETHERS, SILANE, SILICONES.) (QUINONES, BROMIDES, PHENOLS.) (CHEMICAL REACTIONS, CONDENSATION REACTIONS, HYDROLYSIS, COPOLYMERIZATION, FRACTIONATION.) CHROMATOGRAPHIC ANALYSIS.

***ELECTRIC DETONATORS**

AD-272 791 62-2-4 DIV. 8
LABORATORIES FOR RESEARCH AND DEVELOPMENT, FRANKLIN INST., PHILADELPHIA, PA.
(*ELECTRIC DETONATORS, *ELECTIC IGNITERS, *RADIOFREQUENCY ATTENUATORS, *RADIO-FREQUENCY, ELECTROMAGNETIC WAVES, HAZARDS, BROADBAND, ABSORPTION, ATTENUATION, MEASUREMENT, MATERIALS, DESIGN.) FERRITES, IRON COMPOUNDS, CARBONYL RADICALS, POWDERS, DIELECTRICS, RADIO-FREQUENCY FILTERS, PHOSPHORS, LUMINESCENT MATERIALS, PHOTOSENSITIVITY, RESISTORS.

AD-272 873 62-2-4 DIV. 22
MEASUREMENT SYSTEMS, INC., NORWALK, CONN.
(*ELECTRIC IGNITERS, *ELECTRIC DETONATORS, ELECTRIC BRIDGES, TEMPERATURE, DETERMINATION, ELECTRIC WIRE, ELECTROMAGNETIC EFFECTS, HAZARDS, *TEMPERATURE WARNING SYSTMS, DETECTORS, OPTICAL EQUIPMENT, DESIGN.)

***ELECTRIC IGNITERS**

AD-272 791 62-2-4 DIV. 8
LABORATORIES FOR RESEARCH AND DEVELOPMENT, FRANKLIN INST., PHILADELPHIA, PA.
(*ELECTRIC DETONATORS, *ELECTIC IGNITERS, *RADIOFREQUENCY ATTENUATORS, RADIO-FREQUENCY, ELECTROMAGNETIC WAVES, HAZARDS, BROADBAND, ABSORPTION, ATTENUATION, MEASUREMENT MATERIALS, DESIGN.) FERRITES, IRON COMPOUNDS, CARBONYL RADICALS, POWDERS, DIELECTRICS, RADIO-FREQUENCY FILTERS, PHOSPHORS, LUMINESCENT MATERIALS, PHOTOSENSITIVITY, RESISTORS.

AD-272 873 62-2-4 DIV. 22
MEASUREMENT SYSTEMS, INC., NORWALK, CONN.
(*ELECTRIC IGNITERS, *ELECTRIC DETONATORS, ELECTRIC BRIDGES, TEMPERATURE, DETERMINATION, ELECTRIC WIRE, ELECTROMAGNETIC EFFECTS, HAZARDS, *TEMPERATURE WARNING SYSTMS, DETECTORS, OPTICAL EQUIPMENT, DESIGN.)

***ELECTRIC POWER PRODUCTION**

AD-272 753 62-2-4 DIV. 7
GENERAL ATOMIC DIV., GENERAL DYNAMICS CORP., SAN DIEGO, CALIF.
(*ELECTRIC POWER PRODUCTION, *POWER SUPPLIES, THERMIONIC EMISSION, DESIGN, MANUFACTURING METHODS.) (*THERMIONIC EMISSION WITH URANIUM COMPOUNDS AND CARBIDES, ZIRCONIUM COMPOUNDS.) (POWER SUPPLIES FOR POWER REACTORS FOR SPACE FLIGHT.) VACUUM SYSTEMS.

***ELECTRICAL NETWORKS**

AD-272 912 62-2-4 DIV. 8
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
(ANALYSIS OF NONLINEAR SYSTEMS, *ELECTRONIC EQUIPMENT, *OSCILLATORS, TRANSISTORS, DIODES.) (*ELECTRICAL NETWORKS, RESISTANCE, COILS, VACUUM TUBE AMPLIFIERS.) (*HARMONIC ANALYSIS, BESSEL FUNCTIONS, TRANSFORMATIONS (MATHEMATICS), FOURIER ANALYSIS, DIFFERENTIAL EQUATIONS.)

***ELECTROENCEPHALOGRAPHY**

AD-272 782 62-2-4 DIV. 16
WASHINGTON U., ST. LOUIS, MO. SCHOOL OF MEDICINE.
(*LIGHT ADAPTATION, MAN, PHYSIOLOGY, LIGHT, STIMULATION, STRESS (PSYCHOLOGY), STRESS (PHYSIOLOGY).) (*ELECTROENCEPHALOGRAPHY, FREQUENCY ANALYZERS.)

***ELECTROLYTIC CELLS**

AD-272 542 62-2-4 DIV. 7
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*ALKALINE CELLS, *DRY CELLS, *ELECTROLYTIC CELLS, ELECTRODES, ELECTROLYTES, DESIGN.) (MANGANESE DIOXIDE ELECTRODES, ANODES (ELECTROLYTIC CELL), MANGANESE COMPOUNDS, DIOXIDES, GRAPHITE, ALKALI METAL COMPOUNDS.) (CATHODES (ELECTROLYTIC CELL), ZINC.) USSR.

***ELECTROMAGNETIC FIELDS**

AD-272 801 62-2-4 DIV. 30
RANDOLPH-MACON COLL., ASHLAND, VA.
(*ELECTROMAGNETIC FIELDS, *HAZARDS, ORDNANCE.) (*OPTICAL INSTRUMENTS, *DETECTORS, *THERMAL RADIATION.) (ELECTRIC DETONATORS, ELECTRIC IGNITERS, THERMAL RADIATION, MEASUREMENT.) (DIAPHRAGMS (MECHANICS), TESTS, TEST EQUIPMENT, MATERIALS, PNEUMATIC DEVICES.) (GLASS TEXTILES, OPTICS.)

***ELECTROMAGNETIC WAVES**

AD-272 605 62-2-4 DIV. 25
COLUMBIA RADIATION LAB., NEW YORK.
(*MICROWAVES, MICROWAVE FREQUENCY, MICROWAVE NETWORKS, MICROWAVE SPECTROSCOPY.) (MEASUREMENT OF HYPERFINE STRUCTURE OF LITHIUM, IONS.) (ZINC, CADMIUM, ISOTOPES, RADIOACTIVE ISOTOPES.) (SIMULATION OF PLANETARY ATMOSPHERES FOR MEASUREMENT OF ELECTROMAGNETIC PROPERTIES.) (MEASUREMENT, HYDROXIDES, FREE RADICALS.) CRYOGENICS, MASERS, SOLID STATE PHYSICS, NUCLEAR PHYSIC, MOLECULES, RADIO ASTRONOMY, *ELECTROMAGNETI WAVES.

AD-272 841 62-2-4 DIV. 25
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*BIBLIOGRAPHY AND ABSTRACTIN OF *PLASMA PHYSICS, *ELECTROMAGNETIC WAVES, WAVE TRANSMISSION, MICROWAVES.) (THEORY, EXPERIMENTAL DATA AND FEASIBILITY STUDIES.)

***ELECTRON BEAMS**

AD-272 556 62-2-4 DIV. 25
WILLIAMSON DEVELOPMENT CO., INC., WEST CONCORD, MASS.
(*PLASMA OSCILLATIONS, GAS IONIZATION, *GAS DISCHARGES, HELIUM, HYDROGEN.) (BETATRONS, PARTICLES, ORBITAL FLIGHT PATHS, ELECTRONS, *ELECTRON BEAMS, *SECONDARY EMISSION.) *LOW PRESSURE RESEARCH.

AD-272 691 62-2-4 DIV. 25
AMERICAN MACHINE AND FOUNDRY CO., ALEXANDRIA, VA.
(*MATERIALS, THERMAL CONDUCTIVITY, THERMAL DIFFUSION, SPECIFIC HEAT, *HEAT TRANSFER, BLACKBODY RADIATION, THERMODYNAMICS.) (HIGH TEMPERATURE RESEARCH, TEST EQUIPMENT, CYLINDRICAL BODIES, HEATING, *ELECTRON BEAMS, ELECTRON BOMBARDMENT, VACUUM APPARATUS, INSTRUMENTATION.) (STATISTICAL ANALYSIS, DIFFERENTIAL EQUATIONS, THEORY.) (GRAPHITE, ALUMINUM COMPOUNDS, OXIDES, MEASUREMENT, PHSICAL PROPERTIES, SURFACES, DATA.)

***ELECTRON GUNS**

AD-272 627 62-2-4 DIV. 8
WATKINS JOHNSON CO., PALO ALTO, CALIF.
(KLYSTRONS, S BAND, ELECTRON TUBES, *MICROWAVE AMPLIFIERS, *POWER AMPLIFIERS, FEASIBILITY STUDIES.) (ELECTRODES, *ELECTRON GUNS, OPTICS, FOCUSING, SOLENOIDS MAGNETIC FIELDS, ELECTRON BEAMS, CATHODES (ELECTRON TUBES), ANODES (ELECTRON TUBES), HEATING, MODULATION, DESIGN, TESTS, TEST EQUIPMENT.)

***ELECTRON TRANSITIONS**

AD-272 604 62-2-4 DIV. 25
CORNELL U., ITHACA, N. Y.
(*PHOTONS, ABSORPTION, *HELIUM, *LITHIUM.) (ATOMS, ENERGY, ABSORPTION, *ELECTRON TRANSITION.) (INSTRUMENTATION, *X-RAY ABSORPTION ANALYSIS, PHOTOMULTIPLIERS.)

***ELECTRONIC EQUIPMENT**

AD-272 912 62-2-4 DIV. 8
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
(ANALYSIS OF NONLINEAR SYSTEMS, *ELECTRONIC EQUIPMENT, *OSCILLATORS, TRANSISTORS, DIODES.) (*ELECTRICAL NETWORKS, RESISTANCE, COILS, VACUUM TUBE AMPLIFIERS.) (*HARMONIC ANALYSIS, BESSEL FUNCTIONS, TRANSFORMATIONS (MATHEMATICS), FOURIER ANALYSIS, DIFFERENTIAL EQUATIONS.)

***ELECTRONIC SWITCHES**

AD-272 806 62-2-4 DIV. 8
STANFORD ELECTRONICS LABS., STANFORD U., CALIF.
(*SOLID STATE PHYSICS, *ELECTRONICS, *SCIENTIFIC RESEARCH.) (*MICROWAVE OSCILLATORS, *MICROWAVE AMPLIFIERS, *MASERS, SWITCHING CIRCUITS, MATHEMATICAL ANALYSIS, *ELECTRONIC SWITCHES.) (*SEMICONDUCTORS, LATTICES, IONS.) (INFRARED SPECTROSCOPY, EXTREMELY HIGH FREQUENCY MASERS, PARAMETRIC AMPLIFIERS.) (X BAND, CAVITY RESONATORS.) (SEMICONDUCTORS, SILICON, GERMANIUM, GALLIUM COMPOUNDS, ARSENIDES.) (DIGITAL SYSTEMS, DATA PROCESSING SYSTEMS, SOLID STATE PHYSIC.)

***ELECTRONICS**

AD-272 806 62-2-4 DIV. 8
STANFORD ELECTRONICS LABS., STANFORD U., CALIF.
(*SOLID STATE PHYSICS, *ELECTRONICS, *SCIENTIFIC RESEARCH.) (*MICROWAVE OSCILLATORS, *MICROWAVE AMPLIFIERS, *MASERS, SWITCHING CIRCUITS, MATHEMATICAL ANALYSIS, *ELECTRONIC SWITCHES.) (*SEMICONDUCTORS, LATTICES, IONS.) (INFRARED SPECTROSCOPY, EXTREMELY HIGH FREQUENCY MASERS, PARAMETRIC AMPLIFIERS.) (X BAND, CAVITY RESONATORS.) (SEMICONDUCTORS, SILICON, GERMANIUM, GALLIUM COMPOUNDS, ARSENIDES.) (DIGITAL SYSTEMS, DATA PROCESSING SYSTEMS, SOLID STATE PHYSIC.)

***ELECTRONS**

AD-272 954 62-2-4 DIV. 25
GENERAL ATOMIC DIV., GENERAL DYNAMICS CORP., SAN DIEGO, CALIF.
(EXCITATION OF *ELECTRONS IN GASES, SEMICONDUCTORS AND METALS.) (*RECOMBINATION REACTIONS, *TRANSPORT PROPERTIES, IONIZATION.) (SECONDARY EMISSION, NUCLEAR ENERGY, GAMMA RAYS, CONDUCTIVITY.) (ELECTRONIC EQUIPMENT, CAPACITORS, RESISTORS, TRANSISTORS, TRANSMISSION LINES, ELECTRIC CABLES.)

***ENERGY**

AD-272 657 62-2-4 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
(*MAGNETOHYDRODYNAMICS, PLASMA PHYSICS, FLUID FLOW, CONTINUUM MECHANICS, THERMAL CONDUCTIVITY, *ENERGY.) (*SHOCK WAVES, WAVE TRANSMISSION, *THERMIONIC EMISSION, *FUEL CELLS, PARAMETRIC AMPLIFIERS.)

AD-272 930 62-2-4 DIV. 25
SERVOMECHANISMS, INC., GOLETA, CALIF.
(THEORY, PRODUCTION OF *ENERGY FOR TRANSDUCERS, DATA PROCESSING SYSTEMS, DISPLAY SYSTEMS.) (ELECTRONS, LATTICES, SURFACES, ELECTROMAGNETIC EFFECTS, *PARTICLES, MECHANICAL PROPERTIES, THERMODYNAMICS EFFECTS ON *MATERIALS.) MAGNETO-OPTIC ROTATION, ELECTON OPTICS.

***EPOXY RESINS**

AD-272 761 62-2-4 DIV. 14
NEW YORK U. COLL. OF ENGINEERING, N. Y.
(*HEAT RESISTANT POLYMERS, POLYMERS, *METALORGANIC COMPOUNDS, RESINS, *EPOXY RESINS, *COATINGS, PIGMENTS, ADDITIVES, SYNTHESIS, HIGH TEMPERATURE RESEARCH, STABILITY, PYROLYSIS, DETERIORATION.) (COMPLEX COMPOUNDS, PROPYL RADICALS, *TITANATES.

VINYL RADICALS; CYCLOHEXENES; DIOXIDES; TITANIUM COMPOUNDS; ZINC COMPOUNDS; ALUMINUM COMPOUNDS; SILICONES.) (STEEL; PLASTIC COATINGS.)

*ERRORS

AD-272 938 62-2-4 DIV. 5
MOTOROLA, INC., CHICAGO, ILL.
(*DATA TRANSMISSION SYSTEMS; DIGITAL SYSTEMS; *ERRORS; MEASUREMENT.)

*ETHYLENES

AD-272 594 62-2-4 DIV. 4
MONOMER-POLYMER, BORDEN CO., PHILADEPHIA, PA.
(*POLYMERS; *POLYMERIZATION; *STYRENES; *ETHYLENES; STEREOCHEMISTRY.) (SYNTHESIS; STYRENES; FLUORIDES; FLUORINATION; NITRATION; HALOGENATION; SOLUBILITY.) (MOLECULAR STRUCTURE; CHEMICAL REACTIONS; CHEMICAL WARFARE AGENTS; G AGENTS.) (CATALYSIS; CATALYSTS; METALORGANIC COMPOUNDS.)

*EXHAUST GASES

AD-272 813 62-2-4 DIV. 9
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(ROCKET MOTORS; *EXHAUST GASES; GAS FLOW; *JET MIXING FLOW; TURBULENT FLOW; COMPRESSIBLE FLOW; HYPERSONICS; WAKE; TRANSPORT PROPERTIES; MATHEMATICAL ANALYSIS.)

AD-272 960 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(LIQUID ROCKET PROPELLANTS; *BOOSTER ROCKETS; ENGINE CLUSTERS; ROCKET MOTOR NOZZLES; *EXHAUST GASES; AERODYNAMICS GAS FLOW; PRESSURE; MEASUREMENT.)

*EXPLOSIONS

AD-272 396 62-2-4 DIV. 22
BROADVIEW RESEARCH CORP., BURLINGAME, CALIF.
(RDX; *EXPLOSIONS; *BLAST; *SHOCK WAVES; *PRESSURE; MEASUREMENT; PRESSURE GAGES; TERRAIN; CONFIGURATION; TERRAIN MODELS; MODEL TESTS; TEST EQUIPMENT.) (*NUCLEAR EXPLOSIONS; SIMULATION.)

AD-272 909 62-2-4 DIV. 25
AEROCHEM RESEARCH LABS., INC., PRINCETON, N. J.
(*HEAT TRANSFER AND THERMAL CONDUCTIVITY OF *ROCKET PROPELLANTS TO SOLIDS.) (*TRANSPORT PROPERTIES AND COMBUSTION OF GASES; AIR; ETHYLENES; OXYGEN; HYDROGEN.) (*EXPLOSIONS IN PRESSURE CAPSULES; TEMPERATURE; PRESSURE; THERMODYNAMICS; HIGH-PRESSURE RESEARCH; COOLING.) (*INSTRUMENTATION AND LABORATORY EQUIPMENT.) (FUNCTIONS; PARTIAL DIFFERENTIAL EQUATIONS.)

*EXPLOSIVE FORMING

AD-272 693 62-2-4 DIV. 17
DEPARTMENT OF THE ARMY, WASH., D. C.
(*BIBLIOGRAPHY; *METALS; *EXPLOSIVE FORMING; SAFETY DEVICES; *ALLOYS REFRACTORY MATERIALS; HARDENING; WELDING; *MACHINING; THEORY; GAS IONIZATION; HEAT TRANSFER; SHOCK WAVES.)

AD-272 697 62-2-4 DIV. 17
PROPELLER CHEMICAL DIV., CHROMALLOY CORP., EDWARDSVILLE, ILL.
(HEAT RESISTANT ALLOYS; *REFRACTORY MATERIALS; MOLYBDENUM ALLOYS; TITANIUM ALLOYS; TUNGSTEN; SHEETS; *EXPLOSIVE FORMING.) (DEFORMATION; VELOCITY; MEASUREMENT; INSTRUMENTATION; MAGNETS; INDUCTANCE; COILS; ELECTRIC POTENTIAL; VOLTAGE.) ALLOYS; METALS.

*EXTRATERRESTRIAL RADIO WAVES

AD-272 794 62-2-4 DIV. 25
GEOPHYSICS CORP. OF AMERICA, BOSTON, MASS.
(*SOLAR SPECTRUM; ANALYSIS BY OPTICAL EQUIPMENT; PHOTOMETERS; PHOTOMULTIPLIERS; MEASUREMENT; PHOTONS.) (TABLES; ASTRONOMICAL DATA.) PLASMA PHYSICS; *SOLAR NOISE AND *EXTRATERRESTRIAL RADIO WAVES IN *UPPER ATMOSPHERE.

*EXTRUSION

AD-272 515 62-2-4 DIV. 26
WESTINGHOUSE ELECTRIC CORP., BLAIRSVILLE, PA.
(*MACHINE TOOLS; *METALS; *EXTRUSION; EXPLOSIVE FORMING; PNEUMATIC SYSTEMS; HYDRAULIC SYSTEMS.) (MANUFACTURING METHODS; FEASIBILITY STUDIES; PROCESSING; STEEL; STAINLESS STEEL; TITANIUM ALLOYS; ALUMINUM ALLOYS; ALUMINUM; VANADIUM ALLOYS.) (DIES; TOOLS; DESIGN.) (PRESSURE; MOTION; DECELERATION; VELOCITY; INSTRUMENTATION.) AIRFRAMES; STRUCTURES; AIRCRAFT; SPACESHIPS

AD-272 852 62-2-4 DIV. 30
AMERICAN MACHINE AND FOUNDRY CO., NILES, ILL.
(*METAL FORMING PRESSES; *EXTRUSION; *CONTAINERS; CYLINDRICAL BODIES; FAILURE (MECHANICS); *NON-DESTRUCTIVE TESTING; ULTRASONICS; RADIOGRAPHY; SURFACES; ELECTROMAGNETIC FIELDS; MAGNETIC FIELDS; ELECTROMAGNETISM; FEASIBILITY STUDIES.) *BIBLIOGRAPHY.

*EYE

AD-272 774 62-2-4 DIV. 16
RUTGERS U., NEW BRUNSWICK, N. J.
(*RETINA; *COLOR VISION; *RECORDING DEVICES.) (*EYE; PHYSIOLOGY; SENSITIVITY; STIMULATION; VISUAL THRESHOLD; MONOCHROMATIC LIGHT.) (*OPTICAL IMAGES; MEASUREMENT.)

*FAILURE (MECHANICS)

AD-272 624 62-2-4 DIV. 25
SHOCKLEY TRANSISTOR CORP., PALO ALTO, CALIF.
(*FAILURE (MECHANICS); *SILICON; *SEMICONDUCTORS; DIFFUSION; GALLIUM; GRAINS (METALLURGY); CRYSTAL STRUCTURE; LATTICES; DEFORMATION; CHEMICAL IMPURITIES; OXYGEN; SURFACES; CONTAMINATION.) ELECTRICAL PROPERTIES; PHOTOELECTRIC EFFECT.

*FATTY ACIDS

AD-272 579 62-2-4 DIV. 4
NAVAL RESEARCH LAB., WASHINGTON, D. C.
(THIN FILMS; *MONOMOLECULAR FILMS; FLUORIDES; *FATTY ACIDS; FLUORINATION; *WETTING AGENTS; *ADSORPTION; SURFACES; CHROMIUM; PLATINUM; NICKEL; QUARTZ; GLASS.) (STEREOCHEMISTRY; DIPOLE MOMENTS; CHEMICAL BONDS; THEORY.)

*FEASIBILITY STUDIES

AD-272 872 62-2-4 DIV. 25
MICROWAVE LAB., STANFORD U., CALIF.
(*FEASIBILITY STUDIES AND ABSTRACTING OF SCIENTIFIC RESEARCH ON *MICROWAVE EQUIPMENT AND *PLASMA PHYSICS.) RESEARCH PROGRAM ADMINISTRATION.

*FERRITE CORES

AD-272 534 62-2-4 DIV. 8
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*PHASE SHIFTERS; ULTRA HIGH FREQUENCY; FERRITES; MAGNETIC FIELDS; USSR.) (TRANSMISSION LINES; *MICROWAVE EQUIPMENT; *FERRITE CORES; *COAXIAL CABLES; HELIXES; DIELECTRICS; ATTENUATION; RADIO SIGNALS; RADIO TRANSMITTERS; RADIO RECEIVERS; MEASUREMENT.)

*FERROMAGNETIC MATERIALS

AD-272 635 62-2-4 DIV. 25
STRASBOURG U. (FRANCE).
(*IRON COMPOUNDS; *COBALT COMPOUNDS; BORIDES; *PHOSPHIDES; SYNTHESIS.) (ALLOYS; *BORON ALLOYS; TRANSITION ELEMENTS; IRON ALLOYS; COBALT ALLOYS; NICKEL ALLOYS; MANGANESE ALLOYS; *PHOSPHORUS ALLOYS.) (FERROMAGNETISM; *FERROMAGNETIC MATERIALS; FERROELECTRIC CRYSTALS; PARAMAGNETIC CRYSTALS; MAGNETIC PROPERTIES; ANTIFERROMAGNETISM; THERMODYNAMICS.) FRANCE.

AD-272 804 62-2-4 DIV. 25
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
(*FERROMAGNETIC MATERIALS; SYNTHESIS; *METALLIC CRYSTALS; *CRYSTAL STRUCTURE; MAGNETIC PROPERTIES; *PHASE STUDIES; CYLINDRICAL BODIES; MAGNETIC MOMENTS; X-RAY DIFFRACTION ANALYSIS; MICROWAVE SPECTROSCOPY; MEASUREMENT.) (NICKEL COMPOUNDS; COPPER COMPOUNDS; ZINC COMPOUNDS; BARIUM COMPOUNDS LEAD COMPOUNDS; IRON COMPOUNDS; OXIDES.) (PARTICLES; SINTERING; TEMPERATURE.)

*FIBERBOARD

AD-272 636 62-2-4 DIV. 14
INSTITUTE OF PAPER CHEMISTRY, APPLETON, WIS.
(*FIBERBOARD; *WOODPULP FIBERS; *WOODPULP; STABILITY; CHEMICAL WARFARE AGENT; POISONOUS GASES.) (ADDITIVES TO CYANOGEN CHLORIDES; ETHANOLS; AMINES; CALCIUM COMPOUNDS; CARBONATES; ZINC COMPOUNDS; COPPER COMPOUNDS; OXIDES.) (AGING; TEMPERATURE; STORAGE; WATER; ABSORPTION.)

*FIBERS

AD-272 392 62-2-4 DIV. 14
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS., ARMY CHEMICAL CENTER, MD.
(*MATERIALS; *ORGANIC MATERIAS; *CERAMIC MATERIALS; INORGANIC SUBSTANCES; *FIBERS; PRODUCTION; SYNTHESIS; MANUFACTURING METHODS.) (METALORGANIC COMPOUNDS; *POLYMER; *PLASTICS; HEAT RESISTANT POLYMERS; RESINS; LAMINATES; COATINGS; ADHESIVES.) (*SYNTHETIC FIBERS; TEXTILES.) (METALS; ALLOYS.) (TOXICITY; HAZARDS.) (RADIATION EFFECTS; SPACE ENVIRONMENTAL CONDITIONS; GUIDED MISSILES.) SOLID ROCKET PROPELLANTS; *BIBLIOGRAPHY.

*FIELD EMISSION

AD-272 760 62-2-4 DIV. 8
LINFIELD RESEARCH INST., MCMINNVILLE, ORES.
(*CATHODES (ELECTRON TUBES); *FIELD EMISSION; MEASUREMENT; THEORY.) (COLD CATHODE TUBES; ELECTRON TUBES; TETRODES; MICROWAVE EQUIPMENT; ELECTRON OPTICS; TUNGSTEN; MATERIALS; STABILITY; ELECTROLYTIC POLISHING; DESIGN; SURFACE PROPERTIES; CRYSTAL STRUCTURE; ELECTRICAL PROPERTIES; MEASUREMENT.) (VACUUM SYSTEMS; ALUMINUM COMPOUNDS; SILICATES; GLASS; ELECTRON TUBES.)

*FILAMENT WOUND CONSTRUCTION

AD-272 960 62-2-4 DIV. 27
AEROJET-GENERAL CORP., AZUSA, CALIF.
(*ROCKET CASES; *FILAMENT WOUND CONSTRUCTION; MATERIALS; FIBERS; *SYNTHETIC FIBERS; FILAMENTS; GLASS TEXTILES; IMPREGNATION; COATINGS; RESINS; HEAT RESISTANT POLYMERS.) HIGH PRESSURE RESEARCH; HIGH TEMPERATURE RESEARCH; TENSILE PROPERTIES; FAILURE (MECHANICS); TESTS.

AD-272 630 62-2-4 DIV. 14
ROCKETDYNE, CANOGA PARK, CALIF.
(*ROCKET CASES; PROPELLANT TANKS; CYLINDRICAL BODIES; *FILAMENT WOUND CONSTRUCTION; MANUFACTURING METHODS; PROCESSING.) (FIBERS; *SYNTHETIC FIBERS; *GLASS TEXTILES; IMPREGNATION; RESINS; EPOXY RESINS; LAMINATS.) (TESTS; PRESSURE; TENSILE PROPERTIES.) WIRE WINDING MACHINES.

*FIRE CONTROL COMPUTERS

AD-272 879 62-2-4 DIV. 12
OPERATIONS ANALYSIS GROUP, OFFICE OF NAVAL OPERATIONS, WASHINGTON, D. C.
(*FIRE CONTROL COMPUTERS; *COMPUTERS; SIMULATION; INTERCEPTION PROBABILITIES; SURFACE TO AIR; *GUIDED MISSILES; AIRCRAFT.) (*ANTIAIRCRAFT DEFENSE SYSTEMS; COMPUTERS; PROGRAMMING.) (AERIAL TARGETS; INTERCEPTION.) GAMES THEORY.

*FISSION NEUTRONS

AD-272 535 62-2-4 DIV. 20
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*RESEARCH REACTORS; PULSE TRANSMITTERS; FAST REACTORS; CRITICAL ASSEMBLIES; SUPERCRITICAL ASSEMBLIES; NEUTRONS; *NEUTRON FLUX DENSITY; *FISSION NEUTRONS; HEAT TRANSFER; FISSION PRODUCTS; NUCLEAR ENERGY.) USSR.

*FIXED RESISTORS

AD-272 530 62-2-4 DIV. 7
INTERNATIONAL RESISTANCE CO., PHILADELPHIA, PA.
(*FIXED RESISTORS; *RESISTORS; PRODUCTION; PROCESSING; *MANUFACTURING METHODS.) (MATERIALS; FILMS; COATINGS; CARBON ALLOYS; OXIDATION; INHIBITION; MOLDING; MOLDING MATERIALS; RELIABILITY; TESTS; LIFE EXPECTANCY.)

AD-272 795 62-2-4 DIV. 7
INTERNATIONAL RESISTANCE CO., PHILADELPHIA, PA.
(*FIXED RESISTORS; PRODUCTION; MANUFACTURING METHODS; PROCESSING.) (TEMPERATURE; MOISTURE; *SHOCK RESISTANCE; LIFE EXPECTANCY; TESTS; TEST FACILITIES; METAL FILMS; RESISTORS.)

*FLAME PROPAGATION

AD-272 972 62-2-4 DIV. 3
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(*AEROSOLS; MEASUREMENT; *FLAME PROPAGATION; *IGNITION TEMPERATURE; BUTYL RADICALS; METHYL RADICALS; PHTHALATES; NUCLEATION; SODIUM COMPOUNDS; CHLORIDES; DROPS.) (INHIBITION; ADDITIVES; PYROPHORIC MATERIALS.) PHYSICAL PROPERTIES.

*FLAME SPRAYING

AD-272 614 62-2-4 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*REFRACTORY MATERIALS; OXIDES; CHROMIUM COMPOUNDS; ALUMINUM COMPOUNDS.) (*CERAMIC MATERIALS; *CERMETS; SILICON COMPOUNDS; CARBIDES; NITRIDES; CHROMIUM COMPOUNDS; ALUMINUM COMPOUNDS; OXIDES; *FLAME SPRAYING.) (*HEAT RESISTANT ALLOYS; NICKEL ALLOYS; CHROMIUM ALLOYS; IRON ALLOYS.) (HIGH TEMPERATURE RESEARCH; MEASUREMENT OF *BLACKBODY RADIATION.) (TEMPERATURE CONTROL; SUPERSONIC PLANES; HYPERSONICS.) *HEAT RESISTANT PAINTS.

***FLIGHT PATHS**

AD-272 776 62-2-4 DIV. 19
STANFORD RESEARCH INST., MENLO PARK, CALIF.
(*AIR TRAFFIC, *FLIGHT PATHS, AIR TRANSPORTATION, NAVIGATION, METEOROLOGY *IND, CLIMATIC FACTORS.)

***FLORIDA**

AD-272 999 62-2-4 DIV. 30
TEXAS A. AND M. COLL., COLLEGE STATION.
(*OCEANOGRAPHY AND *METEOROLOGY, DATA, *INSTRUMENTATION FOR OCEANOGRAPHIC DATA, METEOLOGICAL DATA.) (ELECTRONIC EQUIPMENT, DATA TRANSMISSION SYSTEMS, DATA STORAGE SYSTEMS, POWER SUPPLIES, TELEMETERING SYSTEMS, *DATA PROCESSING SYSTEMS.) (*IND, BAROMETRIC PRESSURE, OCEAN CURRENTS, TEMPERATURE.) (TRANSDUCERS, ANEMOMETERS.) *FLORIDA.

***FLOWMETERS**

AD-272 692 62-2-4 DIV. 30
AEROJET-GENERAL CORP., SACRAMENTO, CALIF.
(*FLOWMETERS, LIQUID LEVEL GAGES, CALIBRATION, DESIGN, INSTRUMENTATION.) (*CRYOGENICS, LIQUID ROCKET PROPELLANTS, LIQUEFIED GASES, FLUID FLOW, VOLUME MEASUREMENT.)

***FLUID FLOW**

AD-272 903 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D.C.
(*CAVITATION, RELIABILITY, TESTS OF *ROTOR BLADES, *FLUID FLOW, HYDRODYNAMIC, WATER.) (INSTRUMENTATION, VACUUM PUMPS, HEAT EXCHANGERS, VENTURI TUBES, TRANSDUCERS.) (CENTRIFUGAL PUMPS, VAPOR PRESSURE.) PHOTOGRAPHIC ANALYSIS.

***FLUTTER**

AD-272 615 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION WASHINGTON, D. C.
(*SWEPT-BACK WINGS, SWEPT WINGS, ENGINE NACELLES, AERODYNAMICS, TRANSONICS, *FLUTTER, MODEL TESTS, WIND TUNNEL MODELS.) (SUPERSONIC PLANES, TRANSPORT PLANES.)

***FOILS**

AD-272 608 62-2-4 DIV. 14
LITTON INDUSTRIES, VAN NUYS, CALIF.
(*PRINTED CIRCUITS, MATERIALS SURFACE PROPERTIES, ELECTRICAL PROPERTIES, MECHANICAL PROPERTIES.) (TESTS, ELECTRIC INSULATION, RESISTANCE, TEMPERATURE, ADHESION, DETERIORATION, DIELECTRIC PROPERTIES, WATER, ABSORPTION.) (*LAMINATES, PAPER AND PHENOLIC RESINS OR EPOXY RESINS, SILICONE RESINS OR ETHYLENES AND FLUORIDES AND POLYMERS, RESINS AND GLASS TEXTILES.) (*FOILS, COPPER.) CONDUCTORS, TEST METHODS, TEST EQUIPMENT, DESIGN.

***FOURIER ANALYSIS**

AD-272 578 62-2-4 DIV. 25
NAVAL ORDNANCE LAB., WHITE OAK, MD.
(UNDERWATER, *SHOCK WAVES, WAVE ANALYSIS, HARMONIC ANALYSIS, *FOURIER ANALYSIS.)

***FUEL CELLS**

AD-272 657 62-2-4 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
(*MAGNETOHYDRODYNAMICS, PLASMA PHYSICS, FLUID FLOW, CONTINUUM MECHANICS, THERMAL CONDUCTIVITY, *ENERGY.) (*SHOCK WAVES, WAVE TRANSMISSION, *THERMIONIC EMISSION, *FUEL CELLS, PARAMETRIC AMPLIFIERS.)

***FUNCTIONAL ANALYSIS**

AD-272 610 62-2-4 DIV. 15
INSTITUTE FOR FLUID DYNAMICS AND APPLIED MATHEMATICS, U. OF MARYLAND, COLLEGE PARK.
(*PARTIAL DIFFERENTIAL EQUATIONS, *FUNCTIONAL ANALYSIS, INTEGRAL EQUATIONS, SERIES, FUNCTIONS.)

***FUNCTIONS**

AD-272 698 62-2-4 DIV. 15
CALIFORNIA U., BERKELEY.
(*FUNCTIONS AND *POTENTIAL THEORY OF *ELASTICITY AND STRESSES.) (*HARMONIC ANALYSIS, CONFORMAL MAPPING, PARTIAL DIFFERENTIAL EQUATIONS, TAYLOR'S SERIES, POLYNOMIALS, TRANSFORMATIONS (MATHEMATICS).)

***FUSELAGES**

AD-272 908 62-2-4 DIV. V
AEROSPACE CORP., LOS ANGELES, CALIF.
(*AIRFOILS, *WINGS, *BODIES OF REVOLUTION, *FUSELAGES, *AIRPLANE PANELS, AERODYNAMICS, TRANSONICS, SUPERSONICS, HYPERSONICS, DOWNWASH, ELASTICITY, LIFT, PRESSURE, GUST LOADS, TRANSIENTS, MATHEMATICAL ANALYSIS, INTEGRAL EQUATIONS, DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS, MATRIX ALGEBRA.) VISCOSITY, SHOCK WAVES, VORTICES, INTERFERENCE.

***FUZES**

AD-272 989 62-2-4 DIV. 22
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(*NON-DESTRUCTIVE TESTING, *RADIOACTIVE ISOTOPES, GAMMA RAYS, DETECTION, NEUTRON DETECTORS FOR QUALITY CONTROL, WIRE, *SPRINGS, *PROJECTILE FUZES, *FUZES.)

***GAMMA RAYS**

AD-272 871 62-2-4 DIV. 20
NUCLEAR DEFENSE LAB., ARMY CHEMICAL CENTER, MD.
(*SHELTERS: CONCRETE: ROOFS: *GAMMA RAYS: *PENETRATION: MEASUREMENT: TABLES.) (RADIOACTIVE ISOTOPES: COBALT: CESIUM.) (AIR RAID SHELTERS: RADIOACTIVE FALL-OUT: GAMMA RAYS: PENETRATION.)

AD-272 959 62-2-4 DIV. 20
NUCLEAR DEFENSE LAB., ARMY CHEMICAL CENTER, MD.
(*GAMMA RAYS: *CONTAMINATION: *DOSE RATE.) (GAMMA RAYS: SIMULATION: COBALT: CESIUM: RADIOACTIVE ISOTOPES.) (INSTRUMENTATION: IONIZATION CHAMBERS: DOSIMETERS.) SHIELDING.

***GAS BEARINGS**

AD-272 899 62-2-4 DIV. 26
LABORATORIES FOR RESEARCH AND DEVELOPMENT, FRANKLIN INST., PHILADELPHIA, PA.
(*THRUST BEARINGS: *GAS BEARINGS: LUBRICATION: PRESSURE: STABILITY: OSCILLATION: PERTURBATION THEORY: TESTS: MEASUREMENT.)

***GAS DISCHARGES**

AD-272 556 62-2-4 DIV. 25
WILLIAMSON DEVELOPMENT CO., INC., WEST CONCORD, MASS.
(*PLASMA OSCILLATIONS: GAS IONIZATION: *GAS DISCHARGES: HELIUM: HYDROGEN.) (BETATRONS: PARTICLES: ORBITAL FLIGHT PATHS: ELECTRONS: *ELECTRON BEAMS: *SECONDARY EMISSION.) *LOW PRESSURE RESEARCH.

AD-272 821 62-2-4 DIV. 25
MARYLAND U., COLLEGE PARK.
(PLASMA PHYSICS: *SHOCK WAVES: *WAVE TRANSMISSION: *SHOCK TUBES: DESIGN: *GAS DISCHARGES: ELECTROMAGNETIC WAVES: MAGNETIC FIELDS.) (VACUUM SYSTEMS: ULTRAVIOLET RADIATION: ULTRAVIOLET SPECTROSCOPY: INSTRUMENTATION.) (MEASUREMENT OF TEMPERATURE AND DENSITY IN HYDROGEN AND HELIUM.)

***GAS FLOW**

AD-272 532 62-2-4 DIV. 25
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*HEAT TRANSFER: THERMAL CONDUCTIVITY OF *GAS FLOW: SHOCK WAVES IN *SHOCK TUBES: PLASMA PHYSICS: ELECTRIC DISCHARGES.) (*TRANSDUCERS: THIN FILMS: GLASS: DIELECTRICS: PLATINUM.) USSR.

AD-272 789 62-2-4 DIV. 9
GUGGENHEIM JET PROPULSION CENTER, CALIF. INST. OF TECH., PASADENA.
(*GAS IONIZATION AND TRANSPORT PROPERTIES OF *GAS FLOW BY *MICROWAVE PROBES: ELECTRON BEAMS.) (RELIABILITY: TESTS AND MEASUREMENT OF SHOCK WAVES IN ARGON.) (INSTRUMENTATION AND EXPERIMENTAL DATA.)

***GAS IONIZATION**

AD-272 948 62-2-4 DIV. 25
AEROSPACE CORP., LOS ANGELES, CALIF.
(MEASUREMENT OF *TEMPERATURE IN *GASES: HIGH TEMPERATURE RESEARCH: *GAS IONIZATION.) (FUNCTIONS: POTENTIAL THEORY.)

***GASES**

AD-272 773 62-2-4 DIV. 25
PHYSICS: ENGINEERING: CHEMISTRY CORP., BOULDER, COLO.
(QUANTUM MECHANICS: *GASES: *TRANSPORT PROPERTIES: VISCOSITY: SHEAR STRESSES.) TENSOR ANALYSIS.

AD-272 948 62-2-4 DIV. 25
AEROSPACE CORP., LOS ANGELES, CALIF.
(MEASUREMENT OF *TEMPERATURE IN *GASES: HIGH TEMPERATURE RESEARCH: *GAS IONIZATION.) (FUNCTIONS: POTENTIAL THEORY.)

AD-272 980 62-2-4 DIV. 10
CALIFORNIA U., BERKELEY.
(*DETONATION OF *GASES: MIXTURES OF HYDROGEN AND OXYGEN.) (GASES: *SPARK IGNITION: FLAMES: ACCELERATION.) SCHLIEREN PHOTOGRAPHY.

***GENERATORS**

AD-272 837 62-2-4 DIV. 25
AVCO RESEARCH LAB., EVERETT, MASS.
(TESTS AND DESIGN OF *MAGNETOHYDRODYNAMICS: *GENERATORS: COILS: MAGNETIC FIELDS.) (TEMPERATURE: CRYOGENICS: *SUPERCONDUCTIVITY: COOLING.) (HEAT TRANSFER: CONDUCTIVITY.) INTEGRAL EQUATIONS.

***GEOPHYSICS**

AD-272 634 62-2-4 DIV. 2
GEOPHYSICAL INST., U. OF ALASKA, COLLEGE.
(*GEOPHYSICS: EARTH: ELECTRIC CURRENT: TERRESTRIAL MAGNETISM: *IONOSPHERE: COSMIC RAYS: EXTRATERRESTRIAL RADIO WAVES: AURORAE.) (DATA: *TABLES.) (*ARCTIC REGIONS ALASKA.)

***GLASS TEXTILES**

AD-272 630 62-2-4 DIV. 14
ROCKETDYNE, CANOGA PARK, CALIF.
(*ROCKET CASES: PROPELLANT TANKS: CYLINDRICAL BODIES: *FILAMENT WOUND CONSTRUCTION: MANUFACTURING METHODS: PROCESSING.) (FIBERS: *SYNTHETIC FIBERS: *GLASS TEXTILES: IMPREGNATION: RESINS: EPOXY RESINS: LAMINATS.) (TESTS: PRESSURE: TENSILE PROPERTIES.) WIRE *WINDING MACHINES.

AD-272 886 62-2-4 DIV. 27
BENDIX SYSTEMS DIV., BENDIX CORP., SOUTH BEND IND.
(STRUCTURES: *ROCKET CASES: PRESSURE VESSELS: FILAMENT WOUND CONSTRUCTIN: *GLASS TEXTILES: REINFORCING MATERIALS: *PLASTICS: RESINS: LAMINATES.) (TESTS: TEST EQUIPMENT: TEST METHODS: STRESSES: DEFORMATION.)

AD-272 888 62-2-4 DIV. 17
CHANCE VOUGHT CORP., DALLAS, TEX.
(*ALUMINUM ALLOYS: FATIGUE (MECHANICS): STRESSES: CORROSION.) (NIOBIUM ALLOYS: DIFFUSION OF *CERAMIC COATINGS AS OXIDATION INHIBITORS.) (MAGNESIUM ALLOYS: CASTINGS: MECHANICAL PROPERTIES.) (HYDRAULIC SYSTEMS: METAL SEALS: *ALLOYS.) (NICKEL ALLOYS: SHEETS: *HEAT RESISTANT ALLOYS.) (*BLACKBODY RADIATION: ZIRCONIUM COMPOUNDS: OXIDES.) (*PHOTOELASTIC MATERIALS: COATINGS.) (*GLASS TEXTILES: AIRCRAFT CANOPIES.)

***GLIDERS**

AD-272 901 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*GLIDERS: AIRPLANE MODELS: *WIND TUNNEL MODELS: AIRCRAFT CANOPIES: *PNEUMATIC DEVICES: AERODYNAMIC CONFIGURATIONS: AERODYNAMIC HEATING: RE-ENTRY AERODYNAMICS: HYPERSONICS: STABILITY: STABILITY (LONGITUDINAL): FRICTION: SHEAR STRESSES: LIFT: DRAG: AERODYNAMICS: MODEL TESTS.) (*RE-ENTRY VEHICLES: TRIANGULAR *WINGS: DECELERATION: RECOVERY: LANDING: AIRPLANE LANDING.)

***GLOW DISCHARGES**

AD-272 582 62-2-4 DIV. 25
OBSERVATOIRE DE PARIS-MEUDON (FRANCE).
(*GLOW DISCHARGES OF NITROGEN: HELIUM: *RARE GASES.) (ELECTRONS: DISSOCIATION: ELECTRON TRANSITIONS: *TRANSPORT PROPERTIES *RECOMBINATION REACTIONS.) (INSTRUMENTATION AND MEASUREMENT OF ELECTRICAL CONDUCTANCE.)

AD-272 583 62-2-4 DIV. 25
OBSERVATOIRE DE PARIS-MEUDON (FRANCE).
(*NITROGEN: *GLOW DISCHARGES: IONS: ELECTRONS.) (*RECOMBINATION REACTIONS: TRANSPORT PROPERTIES: EXCITATION: INFRARED RADIATION: DISSOCIATION: ULTRAVIOLET RADIATION.) (DISTRIBUTION THEORY: PROBABILITY: SPECTROGRAPHIC DATA: PHOTOMETERS.)

***GOLD ALLOYS**

AD-272 561 62-2-4 DIV. 17
COLUMBIA U., NEW YORK.
(*COPPER ALLOYS: *GOLD ALLOYS: *PHASE STUDIES: PHASE TRANSITIONS: COPPER COMPOUNDS: GOLD COMPOUNDS: *MOLECULAR ASSOCIATION: *RESISTANCE: ELECTRICAL PROPERTIES: THERMOELECTRICITY: MECHANICAL PROPERTIES: ELASTICITY: HIGH TEMPERATURE RESEARCH: THEORY.)

***GRINDERS**

AD-272 668 62-2-4 DIV. 17
SHEFFIELD CORP., DAYTON, OHIO.
(*HEAT RESISTANT ALLOYS: STEEL: STAINLESS STEEL: CHROMIUM ALLOYS: COBALT ALLOYS: MOLYBDENUM ALLOYS: NICKEL ALLOYS: TITANIUM ALLOYS: VANADIUM ALLOYS: ALUMINUM ALLOYS: MACHINING: PROCESSING.) (*MACHINE TOOLS: *GRINDERS: GRINDING WHEELS: *ULTRASONICS: VIBRATION.) TEST EQUIPMENT: INSTRUMENTATION: TESTS: ALLOYS.

***GUIDED MISSILES**

AD-272 597 62-2-4 DIV. 5
ITT KELLOGG, CHICAGO, ILL.
(*GUIDED MISSILES: SURFACE TO SURFACE: *COMMUNICATION SYSTEMS: *COMMUNICATION EQUIPMENT: INSTALLATION IN MILITARY FACILITIES: QUALITY CONTROL: SCHEDULING: GROUND SUPPORT EQUIPMENT.)

AD-272 879 62-2-4 DIV. 12
OPERATIONS ANALYSIS GROUP, OFFICE OF NAVAL OPERATIONS, WASHINGTON, D. C.
(*FIRE CONTROL COMPUTERS: *COMPUTERS: SIMULATION: INTERCEPTION PROBABILITIES: SURFACE TO AIR: *GUIDED MISSILES: AIRCRAFT.) (*ANTIAIRCRAFT DEFENSE SYSTEMS: COMPUTERS: PROGRAMMING.) (AERIAL TARGETS: INTERCEPTION.) GAMES THEORY.

AD-272 885 62-2-4 DIV. 31
DAVID TAYLOR MODEL BASIN, WASHINGTON, D. C.
(*NAVAL VESSELS FOR LAUNCHING: *GUIDED MISSILES: *SHIP HULLS: VIBRATION: TESTS.) (*CARGO SHIPS: *MERCHANT VESSELS: SHIP HULLS: VIBRATION: TESTS.)

***HALOCARBONS**

AD-272 949 62-2-4 DIV. 4
AEROSPACE CORP., LOS ANGELES, CALIF.
(*CARBONYL RADICALS AND *METALORGANIC COMPOUNDS OF TRANSITION ELEMENTS: *HALOCARBONS: SYNTHESIS: CHEMICAL REACTIONS: METALATION: DISPLACEMENT REACTIONS: REDUCTION: GRIGNARD REACTIONS.) (POLYCYCLIC COMPOUNDS: PENTENES: CARBONYL RADICALS AND METALORGANIC COMPOUNDS OR NITROSO RADICALS OR SALTS OR HALIDES OR ALKYL RADICALS OR PHENYL RADICALS OR ANTIMONY COMPOUNDS AND HYDRIDES OR NITRILES OR PHOSPHINES OR ARSINES OR CYANO RADICALS.)

***HANDBOOKS**

AD-272 504 62-2-4 DIV. 6
RADIATION, INC., MELBOURNE, FLA.
(*HANDBOOKS: *TELEMETER SYSTEMS: *TRANSDUCERS: PARTS CATALOGS.) BIBLIOGRAPHY: INDEXES.

***HARMONIC ANALYSIS**

AD-272 698 62-2-4 DIV. 15
CALIFORNIA U., BERKELEY.
(*FUNCTIONS AND *POTENTIAL THEORY OF *ELASTICITY AND STRESSES.) (*HARMONIC ANALYSIS: CONFORMAL MAPPING: PARTIAL DIFFERENTIAL EQUATIONS: TAYLOR'S SERIES: POLYNOMIALS: TRANSFORMATIONS (MATHEMATICS).)

AD-272 912 62-2-4 DIV. 8
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
(ANALYSIS OF NONLINEAR SYSTEMS: *ELECTRONIC EQUIPMENT: *OSCILLATORS: TRANSISTORS: DIODES.) (*ELECTRICAL NETWORKS: RESISTANCE: COILS: VACUUM TUBE AMPLIFIERS.) (*HARMONIC ANALYSIS: BESSEL FUNCTIONS: TRANSFORMATIONS (MATHEMATICS): FOURIER ANALYSIS: DIFFERENTIAL EQUATIONS.)

***HAZARDS**

AD-272 801 62-2-4 DIV. 30
RANDOLPH-MACON COLL., ASHLAND, VA.
(*ELECTROMAGNETIC FIELDS: *HAZARDS: ORDNANCE.) (*OPTICAL INSTRUMENTS: *DETECTORS: *THERMAL RADIATION.) (ELECTRIC DETONATORS: ELECTRIC IGNITERS: THERMAL RADIATION: MEASUREMENT.) (DIAPHRAGMS (MECHANICS): TESTS: TEST EQUIPMENT: MATERIALS: PNEUMATIC DEVICES.) (GLASS TEXTILES: OPTICS.)

***HEAT RESISTANT ALLOYS**

AD-272 614 62-2-4 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*REFRACTORY MATERIALS: OXIDES: CHROMIUM COMPOUNDS: ALUMINUM COMPOUNDS.) (*CERAMIC MATERIALS: *CERMETS: SILICON COMPOUNDS: CARBIDES: NITRIDES: CHROMIUM COMPOUNDS: ALUMINUM COMPOUNDS: OXIDES: *FLAME SPRAYING.) (*HEAT RESISTANT ALLOYS: NICKEL ALLOYS: CHROMIUM ALLOYS: IRON ALLOYS.) (HIGH TEMPERATURE RESEARCH: MEASUREMENT OF *BLACKBODY RADIATION.) (TEMPERATURE CONTROL: SUPERSONC PLANES: HYPERSONICS.) *HEAT RESISTANT PAINTS.

AD-272 668 62-2-4 DIV. 17
SHEFFIELD CORP., DAYTON, OHIO.
(*HEAT RESISTANT ALLOYS: STEEL: STAINLESS STEEL: CHROMIUM ALLOYS: COBALT ALLOYS: MOLYBDENUM ALLOYS: NICKEL ALLOYS: TITANIUM ALLOYS: VANADIUM ALLOYS: ALUMINUM ALLOYS: MACHINING: PROCESSING.) (*MACHINE TOOLS: *GRINDERS: GRINDING WHEELS: *ULTRASONICS: VIBRATION.) TEST EQUIPMENT: INSTRUMENTATION: TESTS: ALLOYS.

***HEAT RESISTANT PAINTS**

AD-272 614 62-2-4 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*REFRACTORY MATERIALS: OXIDES: CHROMIUM COMPOUNDS: ALUMINUM COMPOUNDS.) (*CERAMIC MATERIALS: *CERMETS: SILICON COMPOUNDS: CARBIDES: NITRIDES: CHROMIUM COMPOUNDS: ALUMINUM COMPOUNDS: OXIDES: *FLAME SPRAYING.) (*HEAT RESISTANT ALLOYS: NICKEL ALLOYS:

CHROMIUM ALLOYS• IRON ALLOYS.) (HIGH TEMPERATURE RESEARCH• MEASUREMENT OF •BLACKBODY RADIATION.) (TEMPERATURE CONTROL• SUPERSONC PLANES• HYPERSONICS.) •HEAT RESISTANT PAINTS.

AD-272 780 62-2-4 DIV. 14
SOUTHERN RESEARCH INST.• BIRMINGHAM• ALA.
(•HEAT RESISTANT PAINTS• •PREPARATION FROM METALLIC COMPOUNDS• METALORGAVIC COMPOUNDS• ZINC COMPOUNDS• OXIDES• METHYL RADICALS• HYDROGEN COMPOUNDS• PHOSPHITES• ETHYL RADICALS• PHOSPHATES.) (•METAL COATINGS FOR •METALS• MANUFACTURING METHODS• PROCESSING• PHOSPHATE COATINGS• CERAMIC COATINGS• SILICN COMPOUNDS• DIOXIDES• TEMPERATURE• RESISTANC• •EATHERPROFING• HARDNESS• AGING.)

•HEAT RESISTANT POLYMERS

AD-272 671 62-2-4 DIV. 14
NAUGATUCK CHEMICAL DIV.• UNITED STATES RUBBER CO.• CONN.
(•ELASTOMERS• •HEAT RESISTANT POLYMERS• •VULCANIZATES• SYNTHESIS• POLYMERS• HYDROXIDES• PHENYL RADICALS• ETHERS• SILANE• SILICONES.) (QUINONES• BROMIDES• PHENOLS.) (CHEMICAL REACTIONS• CONDENSATION REACTIONS• HYDROLYSIS• COPOLYMERIZATION• FRACTIONATION.) CHROMATOGRAPHIC ANALYSIS.

AD-272 761 62-2-4 DIV. 14
NE• YORK U. COLL. OF ENGINEERING• N. Y.
(•HEAT RESISTANT POLYMERS• POYMERS• •METALORGANIC COMPOUNDS• RESINS• •EPOXY RESINS• •COATINGS• PIGMENTS• ADDITIVES• SYNTHESIS• HIGH TEMPERATURE RESEARCH• STABILITY• PYROLYSIS• DETERIORATION.) (COMPLEX COMPOUNDS• PROPYL RADICALS• •TITANATES• VINYL RADICALS• CYCLOHEXENES• DIOXIDES• TITANIUM COMPOUNDS• ZINC COMPOUNDS• ALUMINUM COMPOUNDS• SILICONES.) (STEEL• PLASTIC COATINGS.)

AD-272 961 62-2-4 DIV. 14
NAMMCO INDUSTRIES INC.• SAN DIEGO• CALIF.
(HIGH TEMPERATURE RESEARCH• •ADHESIVES• •RESIN ADHESIVES• •HEAT RESISTANT POLYMERS• RESINS• PHENOLIC RESINS• SILICONE RESINS• EPOXY RESINS• •LAMINATES• BINDERS• SYNTHESIS• PYROLYSIS• CHEMICAL REACTIONS.) (TESTS• OXIDATION• RESISTANCE• TENSILE PROPERTIES• TEMPERATURE• STABILITY• BONDING• MECHANICAL PROPERTIES.) ROCKET MOTOR NOZZLES.

•HEAT TRANSFER

AD-272 532 62-2-4 DIV. 25
FOREIGN TECH. DIV.• AIR FORCE SYSTEMS COMMAND• WRIGHT-PATTERSON AIR FORCE BASE• OHIO.
(•HEAT TRANSFER• THERMAL CONDUCTIVITY OF •GAS FLOW• SHOCK WAVES IN •SHOCK TUBES• PLASMA PHYSICS• ELECTRIC DISCHARGES.) (•TRANSDUCERS• THIN FILMS• GLASS• DIELECTRICS• PLATINUM.) USSR.

AD-272 540 62-2-4 DIV. 25
FOREIGN TECH. DIV.• AIR FORCE SYSTEMS COMMAND• WRIGHT-PATTERSON AIR FORCE BASE• OHIO.
(•SUPERAERODYNAMICS• GAS FLOW• •LOW PRESSURE RESEARCH• THERMAL CONDUCTIVITY• CONVECTION• TRANSPORT PROPERTIES• •THERMAL DIFFUSION• •HEAT TRANSFER• KINETIC THEORY.) USSR.

AD-272 691 62-2-4 DIV. 25
AMERICAN MACHINE AND FOUNDRY CO.• ALEXANDRIA• VA.
(•MATERIALS• THERMAL CONDUCTIVITY• THERMAL DIFFUSION• SPECIFIC HEAT• •HEAT TRANSFER• BLACKBODY RADIATION• THERMODYNAMICS.) (HIGH TEMPERATURE RESEARCH• TEST EQUIPMENT• CYLINDRICAL BODIES• HEATING• •ELECTRON BEAMS• ELECTRON BOMBARDMENT• VACUUM APPARATUS• INSTRUMENTATION.) (STATISTICAL ANALYSIS• DIFFERENTIAL EQUATIONS• THEORY.) (GRAPHITE• ALUMINUM COMPOUNDS• OXIDES• MEASUREMENT• PHSICAL PROPERTIES• SURFACES• DATA.)

AD-272 909 62-2-4 DIV. 25
AEROCHEM RESEARCH LABS.• INC.• PRINCETUN• N. .
(•HEAT TRANSFER AND THERMAL CONDUCTIVITY OF •ROCKET PROPELLANTS TO SOLIDS.) (•TRANSPORT PROPERTIES AND COMBUSTION OF GASES• AIR• ETHYLENES• OXYGEN• HYDROGEN.) (•EXPLOSIONS IN PRESSURE CAPSULES• TEMPERATURE• PRESSURE• THERMODYNAMICS• HIGH-PRESSURE RESEARCH• COOLING.) (INSTRUMENTATION AND LABORATORY EQUIPMENT.) (FUNCTIONS• PARTIAL DIFFERENTIAL EQUATIONS.)

•HELICOPTER ROTORS

AD-272 900 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON• D. C.
(HELICOPTER BLADES• •HELICOPTER ROTORS• •IND TUNNEL MODELS• LOAD DISTRIBUTION• MOMENTS• STRESSES• VIBRATION• MEASUREMENT• MODEL TESTS• MATHEMATICAL ANALYSIS• HARMONIC ANALYSIS.)

•HELICOPTERS

AD-272 905 62-2-4 DIV. 1
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON• D. C.
(•HELICOPTERS• DOWNWASH• TURBULENCE• WAKE• HAZARDS TO AIRPLANES• AIRCRAFT DURING AIR TRAFFIC• FLIGHT• FLIGHT TESTING.) AVIATION SAFETY.

•HELIUM

AD-272 604 62-2-4 DIV. 25
CONNELL U.• ITHACA• N. Y.
(•PHOTONS• ABSORPTION• •HELIUM• •LITHIUM.) (ATOMS• ENERGY• ABSORPTION• •ELECTRON TRANSITION.) (INSTRUMENTATION• •X-RAY ABSORPTION ANALYSIS• PHOTOMULTIPLIERS.)

AD-272 637 62-2-4 DIV. 25
CLARENDON LAB.• U. OF OXFORD (GT. BRIT.).
(•HELIUM• ISOTOPES• SOLIDS• LIQUIDS• MAGNETIC PROPERTIES• •NUCLEAR MAGNETIC RESONANCE• NUCLEAR SPIN• RELAXATION TIME• CRYOGENICS• HIGH PRESSURE RESEARCH• LABORATORY EQUIPMENT• RADIOFREQUENCY• MEASUREMENT.)

•HIGH TEMPERATURE RESEARCH

AD-272 614 62-2-4 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON• D. C.
(•REFRACTORY MATERIALS• OXIDES• CHROMIUM COMPOUNDS• ALUMINUM COMPOUNDS.) (•CERAMIC MATERIALS• •CERMETS• SILICON COMPOUNDS• CARBIDES• NITRIDES• CHROMIUM COMPOUNDS• ALUMINUM COMPOUNDS• OXIDES• •PLAME SPRAYING.) (•HEAT RESISTANT ALLOYS• NICKEL ALLOYS• CHROMIUM ALLOYS• IRON ALLOYS.) (HIGH TEMPERATURE RESEARCH• MEASUREMENT OF •BLACKBODY RADIATION.) (TEMPERATURE CONTROL• SUPERSONC PLANES• HYPERSONICS.) •HEAT RESISTANT PAINTS.

AD-272 814 62-2-4 DIV. 25
ADVANCED KINETICS• INC.• COSTA MESA• CALIF.
(•PLASMA PHYSICS• •HIGH TEMPERATURE RESEARCH• STABILITY.) (GAS IONIZATION AND •TRANSPORT PROPERTIES OF HYDROGEN UNDER •MAGNETIC PINCH.) (ELECTROMAGNETIC •AVES• THERMAL RADIATION• MAGNETIC FIELDS• DIPOLE MOMENTS.) (INSTRUMENTATION• VACUUM SYSTEMS• PHOTOMULTIPLIERS• HIGH SPEED PHOTOGRAPHY.)

•HOWITZERS

AD-272 990 62-2-4 DIV. 22
FRANKFORD ARSENAL• PHILADELPHIA• PA.
(ORDNANCE• •STORAGE• HUMIDITY• DETERIORATION• TESTS• •HOWITZERS• •RECOIL MECHANISMS• CORROSION.)

•HUMAN ENGINEERING

AD-272 827 62-2-4 DIV. 28
APPLIED PSYCHOLOGY CORP.• ARLINGTON• VA.
(•HUMAN ENGINEERING• •APPLIED PSYCHOLOGY• •JOB ANALYSIS• RADIO OPERATORS• MAN• ANALYSIS• MEASUREMENT• COLLECTING METHODS• EFFECTIVENESS• ELECTRICAL EQUIPMENT• COMMUNCATION EQUIPMENT.)

AD-272 915 62-2-4 DIV. 28
HUMAN FACTORS RESEARCH• INC.• LOS ANGELES• CALF.
(•DISPLAY SYSTEMS• •MONITORS• AUDITORY SIGNALS• VISUAL SIGNALS• DETECTION• ATTENTION• REACTION (PSYCHOLOGY)• REACTION TIME• BEHAVIOR• VISUAL PERCEPTION• AUDITORY PERCEPTION• •HUMAN ENGINEERING• THEORY.

•HYDRODYNAMICS

AD-272 976 62-2-4 DIV. 9
THERM• INC.• ITHACA• N. Y.
(•HYDRODYNAMICS• AXIALLY SYMMETRIC FLOW• FLUID FLOW PAST •BODIES OF REVOLUTION.) (BOUNDARY LAYER• MOTION• PRESSURE• VELOCITY.) (PERTURBATION THEORY• DISTRIBUTION THEORY• FUNCTIONS.)

•HYPERFINE STRUCTURE

AD-272 620 62-2-4 DIV. 25
INSTITUTE OF OPTICS• U. OF ROCHESTER• N. Y.
(•ALKALI METALS• •RUBIDIUM• HYDROGEN• ATOMS• VAPORS• •HYPERFINE STRUCTUES• NUCLEAR SPINS• RELAXATION TIME• ATOMIC ENERGY LEVELS• DETECTION BY OPTICS.) (PROGRAMMING• DIGITAL COMPUTERS.) OPTICAL EQUIPMENT.

•HYPERVELOCITY PROJECTILES

AD-272 628 62-2-4 DIV. 25
LINCOLN LAB.• MASS. INST. OF TECH.• LEXINGTON.
(•DOPPLER SYSTEMS• MEASUREMENT OF •WAKE• IONIZATION BY ALUMINUM OR NYLON• •HYPERVELOCITY PROJECTILES FROM HYPERVELOCITY GUNS INTO STORAGE TANKS.) (ELECTRONIC EQUIMENT• INSTRUMENTATION• •RADIOFREQUENCY SPECRUM ANALYZERS• WAVEGUIDES• •RADIO SIGNALS• OSCILOSCOPES• PHASE SHIFTERS.) (ELECTROMAGNETIC WAVES• WAVE TRANSMISSION• THERMAL RADIATION.)

AD-272 629 62-2-4 DIV. 25
LINCOLN LAB.• MASS. INST. OF TECH.• LEXINGTON.
(ELECTRONS• DENSITY IN WAKE OF •HYPERVELOCITY PROJECTILES OR PELLETS.) (•RE-ENTRY VEHICLES• SIMULATION.)

•HYPERVELOCITY VEHICLES

AD-272 996 62-2-4 DIV. 9
INSTITUTE OF AEROPHYSICS• U. OF TORONTO (CANAA).
(•HYPERVELOCITY VEHICLES• •AERODYNAMICS• STABILITY• LIFT• DRAG.) (HYPERVELOCITY VEHICLES• FLIGHT PATHS• ATMOSPHERE ENTRY.) •HYPERSONICS.

•ICE

AD-272 522 62-2-4 DIV. 2
MCGILL U. (CANADA).
(•ARCTIC REGIONS• •ALBEDO (ASTRONOMY)• PERIODIC VARIATIONS• MAPS.) (ARCTIC REGIONS• •SNOW• •ICE.)

AD-272 645 62-2-4 DIV. 2
ARCTIC INST. OF NORTH AMERICA• WASHINGTON• D.C.
(•TERRAIN• ANALYSIS OF •ARCTIC REGIONS.) (ENGINEERING• PHYSICAL PROPERTIESOF •ICE.) (•RESEARCH PROGRAM ADMINISTRATION IN OCEANOGRAPHY• METEOROLOGY• GEOLOGY• THERMAL RADIATION• MARINE BIOLOGY• GLACIERS AND GEOPHYSICS.) •BIBLIOGRAPHY.

•IGNITION

AD-272 972 62-2-4 DIV. 3
ARMOUR RESEARCH FOUNDATION• CHICAGO• ILL.
(•AEROSOLS• MEASUREMENT• •FLAME PROPAGATION• •IGNITION• TEMPERATURE• BUTYL RADICALS• METHYL RADICALS• PHTHALATES• NUCLEATION• SODIUM COMPOUNDS• CHLORIDES• DROPS.) (INHIBITION• ADDITIVES• PYROPHORIC MATERIALS.) PHYSICAL PROPERTIES.

•INDEXES

AD-272 572 62-2-4 DIV. 32
THOMPSON RAMO •OOLDRIDGE• INC.• LOS ANGELES• CALIF.
(•LIBRARY SCIENCE• •APPLIED MATHEMATICS• PROBABILITY• STATISTICAL ANALYSIS• TOPOLOGY• ALGEBRAIC TOPOLOGY• ALGEBRA• MATRI ALGEBRA.) (•DOCUMENTATION• •INDEXES.) COMPUTERS.

AD-272 820 62-2-4 DIV. 32
JONKER BUSINESS MACHINES• INC.• GAITHERSBURG•MD.
(•INDEXES• THEORY• •CODING• •CLASSIFICATION• DOCUMENTATION• •LIBRARY SCIENCE• LANGUAGE.) DATA PROCESSING SYSTEMS.

•INDUSTRIAL EQUIPMENT

AD-272 602 62-2-4 DIV. 26
BOEING CO.• SEATTLE• WASH.
(DESIGN• STANDARDIZATION• •INDUSTRIAL EQUIPMENT• •JIGS• TOOLS.) (•TOOLS• AIRFRAMES• AIRCRAFT INDUSTRY.) INDUSTRIAL PRODUCTION• INSTRUCTION MANUALS• SPECIFICATIONS.

AD-272 603 62-2-4 DIV. 26
BOEING CO.• SEATTLE• WASH.
(DESIGN• STANDARDIZATION• •INDUSTRIAL EQUIPMENT• •JIGS• TOOLS.) (•TOOLS• AIRFRAMES• AIRCRAFT INDUSTRY.) INDUSTRIAL PRODUCTION• INSTRUCTION MANUALS• SPECIFICATIONS.)

•INELASTIC SCATTERING

AD-272 607 62-2-4 DIV. 25
KJELLER RESEARCH ESTABLISHMENT (NORWAY).
(•INELASTIC SCATTERING OF •NETRONS IN CRYSTALS OF MAGNETITE• COBALT• POLRIZATION• ELECTRON BEAMS• DIFFRACTION• •NUCLEAR RESONANCE• NUCLEAR SPINS.) (PULSE ANALYZERS• ELECTROMAGNETS• MIRRORS• MAGNETOMETERS• INSTRUMENTATION• VACUUM FURNACES• NEUTRON CRYSTAL SPECTROMETERS.)

•INFORMATION THEORY

AD-272 536 62-2-4 DIV. 8
FOREIGN TECH. DIV.• AIR FORCE SYSTEMS COMMAND• WRIGHT-PATTERSON AIR FORCE BASE• OHIO.
(INSTRUMENTATION FOR •INFORMATION THEORY• SIMULATION AND •CODING• •INVENTIONS.) (SERVOMECHANISMS• PULSE GENERATORS ELECTRICAL NETWORKS• TRANSDUCERS• OSCILLATORS.) USSR.

•INFRARED DETECTORS

AD-272 527 62-2-4 DIV. 9
NAVAL ORDNANCE LAB., CORONA, CALIF.
(•INFRARED DETECTORS, •INFRARED PHOTOCONDUCTORS, INFRARED RADIATION, DETECTOR MEASUREMENT, SIGNAL-TO-NOISE RATIO, SENSITIVITY, STANDARDS, TEST METHODS.)

•INFRARED EQUIPMENT

AD-272 898 62-2-4 DIV. 9
WESTINGHOUSE ELECTRIC CORP., BALTIMORE, MD.
(DESIGN, MANUFACTURING METHODS OF DIRECT CURRENT, •AMPLIFIERS AND •AUDIO-FREQUENCY OSCILLATORS USING TRANSISTORS FOR •INFRARED EQUIPMENT.)

•INFRARED RADIATION

AD-272 554 62-2-4 DIV. 25
AERONUTRONIC, NEWPORT BEACH, CALIF.
(•INFRARED RADIATION, ABSORPTION, •WATER VAPOR.) (INFRARED RADIATION, ATMOSPHERE, TRANSMISSION.) TABLES.

AD-272 816 62-2-4 DIV. 25
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•INFRARED RADIATION IN •CARBON DIOXIDE, •INFRARED SPECTROSCOPY, FLAMES.) (TEMPERATURE, PRESSURE, OPTICS.) (HARMONIC OSCILLATORS, VIBRATION.) (FUNCTIONS, POTENTIAL THEORY.)

•INFRARED SPECTROSCOPY

AD-272 816 62-2-4 DIV. 25
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•INFRARED RADIATION IN •CARBON DIOXIDE, •INFRARED SPECTROSCOPY, FLAMES.) (TEMPERATURE, PRESSURE, OPTICS.) (HARMONIC OSCILLATORS, VIBRATION.) (FUNCTIONS, POTENTIAL THEORY.)

•INSTRUMENTATION

AD-272 903 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D.C.
(•CAVITATION, RELIABILITY, TESTS OF •ROTOR BLADES, •FLUID FLOW, HYDRODYNAMICS, WATER.) (INSTRUMENTATION, VACUUM PUMPS, HEAT EXCHANGERS, VENTURI TUBES, TRANSDUCERS.) (CENTRIFUGAL PUMPS, VAPOR PRESSURE.) PHOTOGRAPHIC ANALYSIS.

AD-272 987 62-2-4 DIV. 30
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(DESIGN OF •VACUUM SYSTEMS, •TORSION BALANCES, QUARTZ, WIRE, ELASTICITY, MAGNETS, COILS.) (•INSTRUMENTATION, MEASUREMENT.)

AD-272 999 62-2-4 DIV. 30
TEXAS A. AND M. COLL., COLLEGE STATION.
(•OCEANOGRAPHY AND •METEOROLOGY, DATA, •INSTRUMENTATION FOR OCEANOGRAPHIC DATA, METEOLOGICAL DATA.) (ELECTRONIC EQUIPMENT, DATA TRANSMISSION SYSTEMS, DATA STORAGE SYSTEMS, POWER SUPPLIES, TELEMETERING SYSTEMS, •DATA PROCESSING SYSTEMS.) (WIND, BAROMETRIC PRESSURE, OCEAN CURRENTS, TEMPERATURE.) (TRANSDUCERS, ANEMOMETERS.) •FLORIDA.

•INTERFEROMETERS

AD-272 883 62-2-4 DIV. 6
UNITED RESEARCH, INC., CAMBRIDGE, MASS.
(ATMOSPHERE, HIGH ALTITUDE, TURBULENCE, MEASUREMENT.) (•INTERFEROMETER, •RADAR.) (RADAR TRANSMITTERS, RADAR RECEIVERS, MICROWAVES, RADAR ANTENNAS, RADAR REFLECTORS.)

AD-272 955 62-2-4 DIV. 12
LABORATORIES FOR RESEARCH AND DEVELOPMENT, FRANKLIN INST., PHILADELPHIA, PA.
(•SPACE NAVIGATION, •CELESTIAL NAVIGATION, ELECTROMAGNETIC WAVES, OPTICAL SYSTEMS, DOPPLER SYSTEMS, STARS, LIGHT TRANSMISSION, SPECTROGRAPHIC ANALYSIS.) (•INTERFEROMETERS, TEMPLATES, LIGHT SOURCES, INTENSITY, SENSITIVITY, TESTS, SIGNAL-TO-NOISE RATIO.)

•INTERMEDIATE FREQUENCY AMPLIFIERS

AD-272 916 62-2-4 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(SYNTHESIS OF ELECTRONIC CIRCUITS, DESIGN FOR NARROWBAND, •INTERMEDIATE FREQUENCY AMPLIFIERS.) TUNED AMPLIFIERS, TUNED CIRCUITS, BAND-PASS AMPLIFIERS.

•INVENTIONS

AD-272 536 62-2-4 DIV. 8
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, •RIGHT-PATTERSON AIR FORCE BASE, OHIO.
(INSTRUMENTATION FOR •INFORMATION THEORY, SIMULATION AND •CODING, •INVENTIONS.) (SERVOMECHANISMS, PULSE GENERATORS ELECTRICAL NETWORKS, TRANSDUCERS, OSCILLATORS.) USSR.

•IODINE

AD-272 770 62-2-4 DIV. 4
SHEFFIELD U. (GT. BRIT.).
(•IODINE, ATOMS, GASES, MIXTURES, NITROGEN COMPOUNDS, OXIDES AND NEON, •RECOMBINATION REACTIONS, ASORPTION.) (COMPLEX IONS, PHOTOLYSIS, REACTION KINETICS, HEAT OF FORMATION.) GREAT BRITAIN.

•IONOSPHERE

AD-272 634 62-2-4 DIV. 2
GEOPHYSICAL INST., U. OF ALASKA, COLLEGE.
(•GEOPHYSICS, EARTH, ELECTRIC CURRENT, TERRESTRIAL MAGNETISM, •IONOSPHERE COSMIC RAYS, EXTRATERRESTRIAL RADIO WAVES, AURORAE.) (DATA, •TABLES.) (•ARCTIC REGIONS ALASKA.)

AD-272 663 62-2-4 DIV. 8
IONOSPHERE RESEARCH LAB., PENNSYLVANIA STATE U., UNIVERSITY PARK.
(ANALYSIS, •IONOSPHERE, MAGNETO-OPTIC ROTATION, •RADIO TRANSMISSION, •SATELLITE VEHICLES.) (MEASUREMENT, MAGNETO-OPTIC ROTATION, RADIO SIGNALS, SATELLITE VEHICLES) (MEASUREMENT, DENSITY, ELECTRONS, IONOSPHERE.)

•IONS

AD-272 783 62-2-4 DIV. 25
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
(•OXYGEN, •IONS, ELECTRONS, CARBON DIOXIDE, CARBON COMPOUNDS, MONOXIDES, •DISSOCIATION, PROBABILITY.)

AD-272 797 62-2-4 DIV. 20
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(•SCATTERING, •TRANSPORT PROPERTIES, DIFFERENTIAL CROSS SECTION, •ATOMS, •IONS, ELECTRONS.) (NUCLEAR ENERGY, NUCLEAR REACTIONS, THERMONUCLEAR REACTIONS.) •BIBLIOGRAPHY.

•IRON

AD-272 562 62-2-4 DIV. 17
KECK, B. M., LAB. OF ENGINEERING MATERIALS, CALIF. INST. OF TECH., PASADENA.
(•METALS, •IRON, HEATING, COOLING, •PHASE TRANSITIONS, TRANSITION TEMPERATURE, RELAXATION TIME, AUSTENITE, MARTENSITE, HIGH TEMPERATURE RESEARCH, THERMODYNAMICS, MATHEMATICAL ANALYSIS, INTEGRAL EQUATIONS.) (WIRE, TEST METHODS, LABORATORY EQUIPMENT, VACUUM FURNACES, ELECTRONIC CIRCUITS.)

•IRON COMPOUNDS

AD-272 635 62-2-4 DIV. 25
STRASBOURG U. (FRANCE).
(•IRON COMPOUNDS, •COBALT COMPOUNDS, BORIDES, •PHOSPHIDES, SYNTHESIS.) (ALLOYS, •BORON ALLOYS, TRANSITION ELEMENTS, IRON ALLOYS, COBALT ALLOYS, NICKEL ALLOYS, MANGANESE ALLOYS, •PHOSPHORUS ALLOYS.) (FERROMAGNETISM, •FERROMAGNETIC MATERIALS, FERROELECTRIC CRYSTALS, PARAMAGNETIC CRYSTALS, MAGNETIC PROPERTIES, ANTIFERROMAGNETISM, THERMODYNAMICS.) FRANCE.

•JET ACOUSTIC OSCILLATIONS

AD-272 617 62-2-4 DIV. 10
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(•COMBUSTION OF LIQUEFIED GASES, HYDROGEN, OXYGEN, COMBUSTION CHAMBERS, ROCKET MOTORS.) (COMBUSTION CHAMBER GASES, EXHAUST GASES, •JET ACOUSTIC OSCILLATIONS, SOUND, ACOUSTICS, VELOCITY, EFFECTIVENESS, MEASUREMENT, DETERMINATION.)

•JET MIXING FLOW

AD-272 813 62-2-4 DIV. 9
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(ROCKET MOTORS, •EXHAUST GASES, GAS FLOW, •JET MIXING FLOW, TURBULENT FLOW, COMPRESSIBLE FLOW, HYPERSONICS, WAKE, TRANSPORT PROPERTIES, MATHEMATICAL ANALYSIS.)

•JIGS

AD-272 602 62-2-4 DIV. 26
BOEING CO., SEATTLE, WASH.
(DESIGN, STANDARDIZATION, •INDUSTRIAL EQUIPMENT, •JIGS, TOOLS.) (•TOOLS, AIRFRAMES, AIRCRAFT INDUSTRY.) INDUSTRIAL PRODUCTION, INSTRUCTION MANUALS, SPECIFICATIONS.

AD-272 603 62-2-4 DIV. 26
BOEING CO., SEATTLE, WASH.
(DESIGN, STANDARDIZATION, •INDUSTRIAL EQUIPMENT, •JIGS, TOOLS.) (•TOOLS, AIRFRAMES, AIRCRAFT INDUSTRY.) (INDUSTRIAL PRODUCTION, INSTRUCTION MANUALS, SPECIFICATIONS.)

•JOB ANALYSIS

AD-272 975 62-2-4 DIV. 23
PSYCHOLOGICAL RESEARCH ASSOCIATES, INC., ARLINGTON, VA.
(•MILITARY PERSONNEL, •WEAPONS, HANDLING.) (•JOB ANALYSIS, EFFECTIVENESS, •ACHIEVEMENT TESTS.)

•KLYSTRONS

AD-272 627 62-2-4 DIV. 8
WATKINS JOHNSON CO., PALO ALTO, CALIF.
(•KLYSTRONS, S BAND, ELECTRON TUBES, •MICROWAVE AMPLIFIERS, •POWER AMPLIFIERS, FEASIBILITY STUDIES.) (ELECTRODES, •ELECTRON GUNS, OPTICS, FOCUSING, SOLENOIDS MAGNETIC FIELDS, ELECTRON BEAMS, CATHODES (ELECTRON TUBES), ANODES (ELECTRON TUBES), HEATING, MODULATION, DESIGN, TESTS, TEST EQUIPMENT.)

•LABELED SUBSTANCES

AD-272 529 62-2-4 DIV. 16
BIRMINGHAM U. (GT. BRIT.).
(•PROTEINS, •LABELED SUBSTANCES, DIET, METABOLISM, •SPRUE, BIOCHEMISTRY, ABSORPTION, METABOLIC PRODUCTS, DEFICIENCY DISEASES.)

•LAMINATES

AD-272 608 62-2-4 DIV. 14
LITTON INDUSTRIES, VAN NUYS, CALIF.
(•PRINTED CIRCUITS, MATERIALS SURFACE PROPERTIES, ELECTRICAL PROPERTIES, MECHANICAL PROPERTIES.) (TESTS, ELECTRIC INSULATION, RESISTANCE, TEMPERATURE, ADHESION, DETERIORATION, DIELECTRIC PROPERTIES, WATER ABSORPTION.) (•LAMINATES, PAPER AND PHENOLIC RESINS OR EPOXY RESINS, SILICONE RESINS OR ETHYLENES AND FLUORIDES AND POLYMERS, RESINS AND GLASS TEATILES.) (•FOILS, COPPER.) CONDUCTORS, TEST METHODS, TEST EQUIPMENT, DESIGN.

AD-272 961 62-2-4 DIV. 14
NARMCO INDUSTRIES INC., SAN DIEGO, CALIF.
(HIGH TEMPERATURE RESEARCH, •ADHESIVES, •RESIN ADHESIVES, •HEAT RESISTANT POLYMERS, RESINS, PHENOLIC RESINS, SILICONE RESINS, EPOXY RESINS, •LAMINATES, BINDERS, SYNTHESIS, PYHOLYSIS, CHEMICAL REACTIONS.) (TESTS, OXIDATION, RESISTANCE, TENSILE PROPERTIES, TEMPERATURE, STABILITY, BONDING, MECHANICAL PROPERTIES.) ROCKET MOTOR NOZZLES.

•LAPSE RATE

AD-272 552 62-2-4 DIV. 2
NEW YORK U. COLL. OF ENGINEERING, N. Y.
(•LAPSE RATE, TEMPERATURE INVERSION, •ATMOSPHERE, STATISTICAL ANALYSIS, TROPICAL REGIONS, PACIFIC OCEAN.)

•LEARNING

AD-272 568 62-2-4 DIV. 28
INDIANA U., BLOOMINGTON.
(•PSYCHOLOGY, •LEARNING, TRANFER OF TRAINING, REASONING, CONDITIONED REFLEX, THEORY, MATHEMATICAL ANALYSIS, PROBABILITY.)

•LENS ANTENNAS

AD-272 777 62-2-4 DIV. 8
SPERRY GYROSCOPE CO., GREAT NECK, N. Y.
(•SLOT ANTENNAS, •LENS ANTENNAS, •AIRPLANE ANTENNAS, •RADAR BEACONS, AIRBORNE, X BAND, IDENTIFICATION SYSTEMS, COMMERCIAL PLANES, AVIATION SAFETY, INSTALLATION, EFFECTIVENESS, ANTENNA RADIATION PATTERNS, FLIGHT TESTING.)

•LIBRARY SCIENCE

AD-272 572 62-2-4 DIV. 32
THOMPSON RAMO WOOLDRIDGE, INC., LOS ANGELES, CALIF.
(•LIBRARY SCIENCE, •APPLIED MATHEMATICS, PROBABILITY, STATISTICAL ANALYSIS, TOPOLOGY, ALGEBRAIC TOPOLOGY, ALGEBRA, MATRIX ALGEBRA.) (•DOCUMENTATION, •INDEXES.) COMPUTERS.

AD-272 820 62-2-4 DIV. 32
JONKER BUSINESS MACHINES, INC., GAITHERSBURG, MD.
(•INDEXES, THEORY, •CODING, •CLASSIFICATION, DOCUMENTATION, •LIBRARY SCIENCE, LANGUAGE.) DATA PROCESSING SYSTEMS.

***LIGHT**

AD-272 576 62-2-4 DIV. 2
HIGH ALTITUDE OBSERVATORY, BOULDER, COLO.
(*SOLAR CORONA; *LIGHT; *SCATTERING BY AEROSOLS.) (ASTROPHYSICS; SOLAR ATMOSPHERE; PARTICLES; LIGHT TRANSMISSION.) THESES.

***LIGHT ADAPTATION**

AD-272 782 62-2-4 DIV. 16
WASHINGTON U., ST. LOUIS, MO. SCHOOL OF MEDICINE.
(*LIGHT ADAPTATION; MAN; PHYSIOLOGY; LIGHT; STIMULATION; STRESS (PSYCHOLOGY); STRESS (PHYSIOLOGY).) (*ELECTROENCEPHALOGRAPHY; FREQUENCY ANALYZERS.)

***LIQUEFIED GASES**

AD-272 892 62-2-4 DIV. 10
ROCKET PROPULSION ESTABLISHMENT (GT. BRIT.).
(*ROCKET OXIDIZERS; LIQUID ROCKET PROPELLANTS; *LIQUEFIED GASES; *OXYGEN; *DENSITY, PRESSURE, TEMPERATURE; LOW TEMPERATURE RESEARCH; THEORY; MATHEMATICAL ANALYSIS.) TABLES; GREAT BRITAIN.

***LIQUID METALS**

AD-272 639 62-2-4 DIV. 17
BIRMINGHAM U. (GT. BRIT.).
(ALLOYS; *TIN ALLOYS; *LIQUID METALS; PHASE STUDIES; PHASE TRANSITIONS; ENTHALPY; *THERMODYNAMICS; *CALORIMETERS; LABORATORY EQUIPMENT; DESIGN.) GREAT BRITAIN.

***LIQUID ROCKET PROPELLANTS**

AD-272 924 62-2-4 DIV. 10
PRINCETON U., N. J.
(*LIQUID ROCKET PROPELLANTS; FUEL INJECTION; FUEL SPRAYS; DROPS; COMBUSTION; CHEMICAL REACTIONS; REACTION KINETICS; STABILITY; HIGH PRESSURE RESEARCH; PRESSURE; TESTS; THEORY.)

***LIQUIDS**

AD-272 772 62-2-4 DIV. 9
POLYTECHNIC INST. OF BROOKLYN, N. Y.
(*VISCOSITY; *LIQUIDS; FLUID FLOW; MIXTURES.) (FLUID MECHANICS; SOLUTIONS; MOLECULES; THERMODYNAMICS.) INTEGRAL EQUATIONS.

***LITHIUM**

AD-272 604 62-2-4 DIV. 25
CORNELL U., ITHACA, N. Y.
(*PHOTONS; ABSORPTION; *HELIUM; *LITHIUM.) (ATOMS; ENERGY; ABSORPTION; *ELECTRON TRANSITION.) (INSTRUMENTATION; *X-RAY ABSORPTION ANALYSIS; PHOTOMULTIPLIERS.)

***LITHIUM ALLOYS**

AD-272 683 62-2-4 DIV. 17
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
(ALLOYS; *MAGNESIUM ALLOYS; *LITHIUM ALLOYS; ALUMINUM ALLOYS; ZINC ALLOYS; PHASE STUDIES; CRYSTAL STRUCTURE; PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; TENSILE PROPERTIES.)

***LOAD DISTRIBUTION**

AD-272 550 62-2-4 DIV. 25
ILLINOIS INST. OF TECH., CHICAGO.
(*LOAD DISTRIBUTION; LOADING F *STRUCTURAL SHELLS; PLASTICS; STRESSES; *PLASTIC FLOW.) (STRESSES; MATHEMATICAL ANALYSIS.)

AD-272 551 62-2-4 DIV. 25
ILLINOIS INST. OF TECH., CHICAGO.
(*LOAD DISTRIBUTION AND LOADING OF *STRUCTURAL SHELLS; ELASTICITY; STRESSES; *CONICAL BODIES; BODIES OF REVOLUTION; PLASTICS.) (STRESSES; MATHEMATICAL ANALYSIS.)

AD-272 577 62-2-4 DIV. 9
NAVAL ORDNANCE TEST STATION, CHINA LAKE, CALIF.
(*SPHERES; **WATER ENTRY; *LOAD DISTRIBUTION.) (HYDRODYNAMICS; DRAG; FLUID FLOW.)

AD-272 649 62-2-4 DIV. 25
BROWN U. DIV. OF APPLIED MATHEMATICS, PROVIDENCE, R. I.
(*STRESSES ON *STRUCTUHAL SHELS UNDER LOADING AND *LOAD DISTRIBUTION; MECHANICS; SHEAR STRESSES.) (TENSOR ANALYSIS; FUNCTIONS; PARTIAL DIFFERENTIAL EQUATIONS; POLYNOMIALS; LINEAR SYSTEMS.)

AD-272 664 62-2-4 DIV. 25
ROCK ISLAND ARSENAL LAB., ILL.
(*BEAMS; *DEFLECTION; *LOAD DISTRIBUTIONS; SHEAR STRESSES.) (STRESSES; MATHEMATICAL ANALYSIS.)

AD-272 956 62-2-4 DIV. 25
ILLINOIS U., URBANA.
(*LOAD DISTRIBUTION; LOADING OF HEMISPHERICAL SHELLS AND *STRUCTURAL SHELLS BY *BLAST AND SHOCK WAVES.) (STRESSES; ELASTICITY; MATHEMATICAL ANALYSIS.)

***LOW PRESSURE RESEARCH**

AD-272 540 62-2-4 DIV. 25
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*SUPERAERODYNAMICS; GAS FLOW; *LOW PRESSURE RESEARCH; THERMAL CONDUCTIVITY; CONVECTION; TRANSPORT PROPERTIES; *THERMAL DIFFUSION; *HEAT TRANSFER; KINETIC THEORY.) USSR.

AD-272 556 62-2-4 DIV. 25
WILLIAMSON DEVELOPMENT CO., INC., WEST CONCORD, MASS.
(*PLASMA OSCILLATIONS; GAS IONIZATION; *GAS DISCHARGES; HELIUM; HYDROGEN.) (BETATRONS; PARTICLES; ORBITAL FLIGHT PATHS; ELECTRONS; *ELECTRON BEAMS; *SECONDARY EMISSION.) *LOW PRESSURE RESEARCH.

***LUBRICATION**

AD-272 555 62-2-4 DIV. 26
WESTINGHOUSE ELECTRIC CO., EAST PITTSBURGH, PA.
(*LUBRICATION *GEARS; *BALL BEARINGS; LOW PRESSURE RESEARCH; MATERIALS; FRICTION; EVAPORATION.) (LUBRICANTS; *POWDERS; SOLIDS; POROUS MATERIALS; *PLASTICS; BEARINGS; *ALLOYS; CERMETS; POWDER METALS; SINTERED ALLOYS.) (TEST EQUIPMENT; VACUUM APPARATUS.)

***LUMINESCENT MATERIALS**

AD-272 786 62-2-4 DIV. 25
WESTINGHOUSE ELECTRIC CORP., BLOOMFIELD, N. J.
(LUMINESCENCE; *LUMINESCENT MATERIALS; LUMINESCENT PIGMENTS; *PHOSPHORS; *CRYSTAL PHOSPHORS; CALCIUM.) (*COMPLEX COMPOUNDS; *ZINC COMPOUNDS; *SULFIDES AND COPPER COMPOUNDS; THALLIUM COMPOUNDS; LITHIUM COMPOUNDS; IRON COMPOUNDS; IODIDES; CADMIUM COMPOUNDS; ALUMINUM COMPOUNDS; MERCURY COMPOUNDS; OXYGEN COMPOUNDS.) (PHOTOEMISSION; EXCITATION.) (DIELECTRICS; PLASTICS; IMPREGNATION; PHOSPHORS.)

AD-272 929 62-2-4 DIV. 25
SERVOMECHANISMS, INC., GOLETA, CALIF.
(*THIN FILMS; *DIELECTRIC FILS; MAGNETIC MATERIALS; *LUMINESCENT MATERIALS; LUMINOUS PIGMENTS; *PHOSPHORS; MATERIALS; METALLIC SMOKE DEPOSITS; ZINC COMPOUNDS; SULFIDES; CATALYSTS; POWDER METALS; MANGANESE; SURFACES; GLASS; PHOTOEMISSION; EXCITATION; ELECTRICITY.) MANUFACTURING METHODS; VACUUM APPARATUS.

***LUNAR PROBES**

AD-272 877 62-2-4 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*LUNAR PROBES; ORBITAL FLIGHT PATHS; DECELERATION; LANDING ON MOON BY RETO ROCKETS; THRUST; FUEL CONSUMPTION; MATHEMATCAL ANALYSIS; FEASIBILITY STUDIES.)

AD-272 902 62-2-4 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*LUNAR PROBES; *SPACESHIPS, MANNED; LAUNCHING; SPACE FLIGHT; ORBITAL FLIGHT PATHS; GUIDED MISSILE TRAJECTORIES; EXTERIOR BALLISTICS; TERMINAL BALLISTICS; ATMOSPHERE ENTRY; LANDING; MATHEMATICAL ANALYSIS; MATHEMATICAL PREDICTION.)

***MACHINE TOOLS**

AD-272 515 62-2-4 DIV. 26
WESTINGHOUSE ELECTRIC CORP., BLAIRSVILLE, PA.
(*MACHINE TOOLS; *METALS; *EXTRUSION; EXPLOSIVE FORMING; PNEUMATIC SYSTEMS; HYDRAULIC SYSTEMS.) (MANUFACTURIN METHODS; FEASIBILITY STUDIES; PROCESSING; STEEL; STAINLESS STEEL; TITANIUM ALLOYS; ALUMINUM ALLOYS; ALUMINUM; VANADIUM ALLOYS.) (DIES; TOOLS; DESIGN.) (PRESSURE; MOTION; DECELERATION; VELOCITY; INSTRUMENTATION.) AIRFRAMES; STRUCTURES; AIRCRAFT; SPACESHIPS

***MACHINING**

AD-272 693 62-2-4 DIV. 17
DEPARTMENT OF THE ARMY, WASH., D. C.
(*BIBLIOGRAPHY; *METALS; *EXPLOSIVE FORMING; SAFETY DEVICES; *ALLOYS REFRACTORY MATERIALS; HARDENING; *WELDING; *MACHINING; THEORY; GAS IONIZATION; HEAT TRANSFER; SHOCK WAVES.)

***MAGNESIUM**

AD-272 809 62-2-4 DIV. 20
UNITED NUCLEAR CORP., *WHITE PLAINS, N. Y.
(*NEUTRON CROSS SECTIONS; *TITANIUM; *POTASSIUM; *MAGNESIUM; *NITROGEN; ALUMINUM; SILICON; SODIUM; OXYGEN.) (NEUTRONS; SCATTERING; GAMMA RAYS.) TABLES.

***MAGNESIUM ALLOYS**

AD-272 666 62-2-4 DIV. 7
RADIO CORP. OF AMERICA, SOMERVILLE, N. J.
(*PRIMARY BATTERIES; *DRY CELL; *MAGNESIUM ALLOYS; *NITRO RADICALS; *ORGANIC COMPOUNDS; THEORY; ELECTROCHEMISTRY.) (CATHODES (ELECTROLYTIC CELL); CARBON; BENZENES; NITRO RADICALS; HETEROCYCLIC COMPOUNDS; PYRIDINES; PYRIMIDINES; FURAN; THIOPHENES.) (ELECTROLYTES; MAGNESIUM COMPOUNDS; PERCHLORATES; BROMIDES.) (ANODES (ELECTROLYTIC CELL); MAGNESIUM ALLOYS.)

AD-272 683 62-2-4 DIV. 17
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
(ALLOYS; *MAGNESIUM ALLOYS; *LITHIUM ALLOYS; ALUMINUM ALLOYS; ZINC ALLOYS; PHASE STUDIES; CRYSTAL STRUCTURE; PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; TENSILE PROPERTIES.)

***MAGNETIC DETECTORS**

AD-272 838 62-2-4 DIV. 6
GOODYEAR AIRCRAFT CORP., AKRON, OHIO.
(*MAGNETIC DETECTORS; *MINE DETECTORS, DESIGN.) (*OPTICAL FILTERS; CORRELATION TECHNIQUES; FEASIBILITY STUDIES; MATHEMATICAL ANALYSIS.) (CATHODE RAY TUBES; DISPLAY SYSTEMS; PHOTOGRAPHIC RECORDING SYSTEMS.)

AD-272 861 62-2-4 DIV. 6
GOODYEAR AIRCRAFT CORP., AKRON, OHIO.
(*MAGNETIC DETECTORS; ELECTROMAGNETIC FIELDS; MAGNETIC FIELDS; *MINE DETECTORS; SIGNALS; FEASIBILITY STUDIES.) (MAGNETIC DETECTORS; SIGNALS; NONLINEAR SYSTEMS; ELECTRICAL NETWORKS; DIFFERENTIATING CIRCUITS.)

***MAGNETIC FIELDS**

AD-272 831 62-2-4 DIV. 2
ELECTRO-MECHANICS CO., AUSTIN, TEX.
(*MAGNETIC FIELDS; *PLANETARY ATMOSPHERES; INTERSTELLAR MATTER; *SPACE PROBES; SOLAR ATMOSPHERE; SOLAR CORONA; *TERRESTRIAL MAGNETISM; SOLAR NOISE.) (*MAGNETOHYDRODYNAMICS; SHOCK WAVES; PLASMA PHYSICS.) (INSTRUMENTATION; TESTS; RELIABILITY; MAGNETOMETERS; TELEMETER SYSTEMS; COMMUNICATIONS THEORY.) *BIBLIOGRAPHY.

AD-272 935 62-2-4 DIV. 25
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
(MEASUREMENT OF *MAGNETIC FIEDS IN *MAGNETIC PINCH; *DISCHARGE TUBES; NITROGEN; PLASMA PHYSICS.) (TESTS; EXPERIMENTAL DATA; PHOTOGRAPHIC ANALYSIS.) OSCILLOGRAPHS; PERTURBATION THEORY.

***MAGNETIC PINCH**

AD-272 814 62-2-4 DIV. 25
ADVANCED KINETICS, INC., COSTA MESA, CALIF.
(*PLASMA PHYSICS; *HIGH TEMPERATURE RESEARCH; STABILITY.) (GAS IONIZATION AND *TRANSPORT PROPERTIES OF HYDROGEN UNDER *MAGNETIC PINCH.) (ELECTROMAGNETIC WAVES; THERMAL RADIATION; MAGNETIC FIELDS; DIPOLE MOMENTS.) (INSTRUMENTATION; VACUUM SYSTEMS; PHOTOMULTIPLIERS; HIGH SPEED PHOTOGRAPHY.)

AD-272 935 62-2-4 DIV. 25
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
(MEASUREMENT OF *MAGNETIC FIEDS IN *MAGNETIC PINCH; *DISCHARGE TUBES; NITROGEN; PLASMA PHYSICS.) (TESTS; EXPERIMENTAL DATA; PHOTOGRAPHIC ANALYSIS.) OSCILLOGRAPHS; PERTURBATION THEORY.

***MAGNETIC TAPE**

AD-272 675 62-2-4 DIV. 8
AERONAUTICAL ELECTRONIC AND ELECTRICAL LAB., NAVAL AIR DEVELOPMENT CENTER, JOHNSVILLE, PA.
(MEMORY DEVICES; *MAGNETIC TAPE; *THIN FILMS.) (*METAL FILMS; MAGNETIC PROPERTIES.)

***MAGNETO-OPTIC ROTATION**

AD-272 973 62-2-4 DIV. 25
ANTENNA LAB., OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
(ANALYSIS OF THEORY OF *MAGNETO-OPTIC ROTATION IN PARAMAGNETIC SALTS.) (MICROWAVES; RESONANCE ABSORPTION.) (MAGNEO-OPTIC ROTATION OF LIGHT.) (MICROWAVES; MODULATION OF LIGHT.)

***MAGNETOHYDRODYNAMICS**

AD-272 657 62-2-4 DIV. 25
RESEARCH LAB. OF ELECTRONICS. MASS. INST. OF TECH.. CAMBRIDGE.
(*MAGNETOHYDRODYNAMICS. PLASMA PHYSICS. FLUID FLOW. CONTINUUM MECHANICS. THERMAL CONDUCTIVITY. *ENERGY.) (*SHOCK WAVES. WAVE TRANSMISSION. *THERMIONIC EMISSION. *FUEL CELLS. PARAMETRIC AMPLIFIERS.)

AD-272 808 62-2-4 DIV. 25
UNIVERSITY OF SOUTHERN CALIF.. ENGINEERING CENTER. LOS ANGELES.
(*PLASMA PHYSICS. *MAGNETOHYDRODYNAMICS. ELECTROMAGNETIC WAVES. SCATTERING.) (*FEASIBILITY STUDIES. *PARAMETRIC AMPLIFIERS. CESIUM. MICROWAVES. PLASMA OSCILLATIONS. CONDUCTIVITY.) (PERTURBATION THEORY. POLYNOMIALS.)

AD-272 831 62-2-4 DIV. 2
ELECTRO-MECHANICS CO.. AUSTIN. TEX.
(*MAGNETIC FIELDS. *PLANETARY ATMOSPHERES. INTERSTELLAR MATTER. *SPACE PROBES. SOLAR ATMOSPHERE. SOLAR CORONA. *TERRESTRIAL MAGNETISM. SOLAR NOISE.) (*MAGNETOHYDRODYNAMICS. SHOCK WAVES. PLASMA PHYSICS.) (INSTRUMENTATION. TESTS. RELIABILITY. MAGNETOMETERS. TELEMETER SYSTEMS. COMMUNICATIONS THEORY.) *BIBLIOGRAPHY.

AD-272 836 62-2-4 DIV. 25
AVCO RESEARCH LAB.. EVERETT. MASS.
(*MAGNETOHYDRODYNAMICS. GENERATORS IN *NUCLEAR PROPULSION.) (ROCKET PROPULSION. *ROCKET PROPELLANTS. *NUCLEAR POWER PLANTS. DESIGN.) (THERMODYNAMICS. HEAT TRANSFER. ENTROPY. HEAT EXCHANGERS. THRUST AUGMENTOR NOZZLES.)

AD-272 837 62-2-4 DIV. 25
AVCO RESEARCH LAB.. EVERETT. MASS.
(TESTS AND DESIGN OF *MAGNETOHYDRODYNAMICS. *GENERATORS. COILS. MAGNETIC FIELDS.) (TEMPERATURE. CRYOGENICS. *SUPERCONDUCTIVITY. COOLING.) (HEAT TRANSFER. CONDUCTIVITY.) INTEGRAL EQUATIONS.

***MAGNETRONS**

AD-272 658 62-2-4 DIV. 8
ELECTRONICS RESEARCH LAB.. U. OF CALIF.. BERKELEY.
(*BACKWARD-WAVE AMPLIFIERS. *MAGNETRONS. RADIOFREQUENCY AMPLIFIERS. ELECTROMAGNETIC WAVES. WAVE TRANSMISSION. ELECTRON GUNS. ELECTRON BEAMS. TRANSFORMATIONS (MATHEMATICS). *NOISE (RADIO). PERTURBATION THEORY. MATRIX ALGEBRA. INTEGRAL EQUATIONS. THEORY. MEASUREMENT.)

***MAINTENANCE PERSONNEL**

AD-272 688 62-2-4 DIV. 28
NAVAL PERSONNEL RESEARCH FIELD ACTIVITY. SAN DIEGO. CALIF.
(*MAINTENANCE PERSONNEL. NAVAL PERSONNEL. AVIATION PERSONNEL. MILITARY TRAINING. ACHIEVEMENT TESTS.)

***MANAGEMENT ENGINEERING**

AD-272 951 62-2-4 DIV. 26
AEROSPACE CORP.. INGLEWOOD. CALIF.
(*MANAGEMENT ENGINEERING. ANALYSIS. SCHEDULING. PRODUCTION. *RESEARCH PROGRAM ADMINISTRATION.)

***MANUFACTURING METHODS**

AD-272 530 62-2-4 DIV. 7
INTERNATIONAL RESISTANCE CO.. PHILADELPHIA. PA.
(*FIXED RESISTORS. *RESISTORS. PRODUCTION. PROCESSING. *MANUFACTURING METHODS.) (MATERIALS. FILMS. COATINGS. CARBON ALLOYS. OXIDATION. INHIBITION. MOLDING. MOLDING MATERIALS. RELIABILITY. TESTS. LIFE EXPECTANCY.)

AD-272 564 62-2-4 DIV. 27
GENERAL ELECTRIC CO.. CINCINNATI. OHIO.
(*ROCKET MOTOR NOZZLES. *TUNGSTEN. SHEETS. PROCESSING. *MANUFACTURING METHODS.) (TOOLS. DESIGN.) (CONICAL BODIES OF METAL PLATES. PRODUCTION. LATHES.)

AD-272 633 62-2-4 DIV. 8
MOTOROLA. INC.. PHOENIX. ARIZ.
(*TRANSISTORS. MICROWAVE EQUIPMENT. RADIOFREQUENCY POWER. ULTRA HIGH FREQUENCY. PRODUCTION. *MANUFACTURING METHODS. MILITARY REQUIREMENTS. PROCESSING. SPECIFICATIONS.) (TRANSISTORS. SEMICONDUCTORS. GERMANIUM. LIFE EXPECTANCY. PACKAGED CIRCUITS. DESIGN.)

AD-272 878 62-2-4 DIV. 8
PACIFIC SEMICONDUCTORS. INC.. LAWNDALE. CALIF.
(*PRODUCTION. ENGINEERING. ANALYSIS FOR PRODUCTION OF VERY HIGH FREQUECY SILICON. *TRANSISTORS.) *MANUFACTURING METHODS. TEST EQUIPMENT FOR PRODUCTION OF TRANSISTORS.

***MAPPING**

AD-272 586 62-2-4 DIV. 25
SYRACUSE U. RESEARCH INST.. N. Y.
(ANALYSIS. *ATMOSPHERE. *REFRACTION.) (OPTICS. LIGHT. DENSITY. *REFRACTIVE INDEX. OPTICAL IMAGES.) (*AERIAL PHOTOGRAPY. *MAPPING.)

***MARS**

AD-272 559 62-2-4 DIV. 12
RAND CORP.. SANTA MONICA. CALIF.
(*SPACESHIPS. THRUST. *EARTH O *MARS. FLIGHT PATHS. PROPULSION. THEORY.) (*CONTROL SYSTEMS. *NON-LINEAR DIFFERENTIAL EQUATIONS. INTEGRAL EQUATIONS. MATRIX ALGEBRA. VECTOR ANALYSIS. TRANSFORMATIONS (MATHEMATICS). INEQUALITIES.)

***MASERS**

AD-272 806 62-2-4 DIV. 9
STANFORD ELECTRONICS LABS.. STANFORD U.. CALIF.
(*SOLID STATE PHYSICS. *ELECTRONICS. *SCIENTIFIC RESEARCH.) (*MICROWAVE OSCILLATORS. *MICROWAVE AMPLIFIERS. *MASERS. SWITCHING CIRCUITS. MATHEMATICAL ANALYSIS. *ELECTRONIC SWITCHES.) (*SEMICONDUCTORS. LATTICES. IONS.) (INFRARED SPECTROSCOPY. EXTREMELY HIGH FREQUENCY. MASERS. PARAMETRIC AMPLIFIERS.) (X BAND CAVITY RESONATORS.) (SEMICONDUCTORS. SILICON. GERMANIUM. GALLIUM COMPOUNDS. ARSENIDES.) (DIGITAL SYSTEMS. DATA PROCESSING SYSTEMS. SOLID STATE PHYSIC.)

AD-272 843 62-2-4 DIV. 25
RESEARCH LAB. OF ELECTRONICS. MASS. INST. OF TECH.. CAMBRIDGE.
(SOLID STATE PHYSICS. *MASERS IN PARAMAGNETIC CRYSTALS. *PARAMAGNETIC RESONANCE.) (*RUBY. CRYSTAL STRUCTURE. LATTICS. *RELAXATION TIME. NUCLEAR SPINS. POLARIZATION.) (QUANTUM MECHANICS. *NUCLEAR ENERGY LEVELS. ELECTROMAGNETIC FIELDS.) (TESTS AN MEASUREMENT BY INSTRUMENTATION. KLYSTRONS. OSCILLOSCOPES. PULSE GENERATORS. WAVEMETERS.)

***MATERIALS**

AD-272 592 62-2-4 DIV. 14
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS.. ARMY CHEMICAL CENTER. MD.
(*MATERIALS. *ORGANIC MATERIAS. *CERAMIC MATERIALS. INORGANIC SUBSTANCES. *FIBERS. PRODUCTION. SYNTHESIS. MANUFACTURING METHODS.) (METALORGANIC COMPOUNDS. *POLYMER. *PLASTICS. HEAT RESISTANT POLYMERS. RESINS. LAMINATES. COATINGS. ADHESIVES.) (*SYNTHETIC FIBERS. TEXTILES.) (METALS. ALLOYS.) (TOXICITY. HAZARDS.) (RADIATION EFFECTS. SPACE ENVIRONMENTAL CONDITIONS. GUIDED MISSILES.) SOLID ROCKET PROPELLANTS. *BIBLIOGRAPHY.

AD-272 691 62-2-4 DIV. 25
AMERICAN MACHINE AND FOUNDRY CO.. ALEXANDRIA. VA.
(*MATERIALS. THERMAL CONDUCTIVITY. THERMAL DIFFUSION. SPECIFIC HEAT. *HEAT TRANSFER. BLACKBODY RADIATION. THERMODYNAMICS.) (HIGH TEMPERATURE RESEARCH. TEST EQUIPMENT. CYLINDRICAL BODIES. HEATING. *ELECTRON BEAMS. ELECTRON BOMBARDMENT. VACUUM APPARATUS. INSTRUMENTATION.) (STATISTICAL ANALYSIS. DIFFERENTIAL EQUATIONS. THEORY.) (GRAPHITE. ALUMINUM COMPOUNDS. OXIDES. MEASUREMENT. PHSICAL PROPERTIES. SURFACES. DATA.)

AD-272 930 62-2-4 DIV. 25
SERVOMECHANISMS. INC.. GOLETA. CALIF.
(THEORY. PRODUCTION OF *ENERGY FOR TRANSDUCERS. DATA PROCESSING SYSTEMS. DISPLAY SYSTEMS.) (ELECTRONS. LATTICES. SURFACES. ELECTROMAGNETIC EFFECTS. PARTICLES. MECHANICAL PROPERTIES. THERMODYNAMICS EFFECTS IN *MATERIALS.) MAGNETO-OPTIC ROTATION. ELECTON OPTICS.

***MATHEMATICAL ANALYSIS**

AD-272 689 62-2-4 DIV. 22
ARMY SIGNAL MISSILE SUPPORT AGENCY. *WHITE SANDS MISSILE RANGE. N. MEX.
(*MATHEMATICAL ANALYSIS. *WIND. *SOUNDING ROCKETS.) INSTRUMENTATION. DATA PROCESSING SYSTEMS. TABLES. LEAST SQUARES METHOD.

***MATHEMATICAL LOGIC**

AD-272 957 62-2-4 DIV. 5
LINCOLN LAB.. MASS. INST. OF TECH.. LEXINGTON.
(*COMMAND SYSTEMS. ANALYSIS. COMMUNICATION SYSTEMS.) (SATELLITE VEHICLES. *TRACKING.) (*DIGITAL COMPUTERS. *MATHEMATICAL LOGIC. DATA TRANSMISSION SYSTEMS. *MASERS. OPTICS. SOLID STATE PHYSICS. IMAGE CONVERTER TUBES.)

***MEDICAL RESEARCH**

AD-272 650 62-2-4 DIV. 3
NAVAL BIOLOGICAL LAB.. U. OF CALIF.. OAKLAND.
(*MEDICAL RESEARCH. *SCIENTIFIC REPORTS.) (COCCIDIOIDES. IMMUNOLOGY.) *BIBLIOGRAPHY. *AEROBIOLOGY. PASTEURELLA. VIRUS DISEASES. EPIDEMIOLOGY. BIOPHYSICS. MEDICAL EQUIPMENT.

***MERCHANT VESSELS**

AD-272 885 62-2-4 DIV. 31
DAVID TAYLOR MODEL BASIN. WASHINGTON. D. C.
(*NAVAL VESSELS FOR LAUNCHING. *GUIDED MISSILES. *SHIP HULLS. VIBRATION. TESTS.) (*CARGO SHIPS. *MERCHANT VESSELS. SHIP HULLS. VIBRATION. TESTS.)

***METAL COATINGS**

AD-272 780 62-2-4 DIV. 18
SOUTHERN RESEARCH INST.. BIRMINGHAM. ALA.
(*HEAT RESISTANT PAINTS. PREPARATION FROM METALLIC COMPOUNDS. METALORGANIC COMPOUNDS. ZINC COMPOUNDS. OXIDES. METHYL RADICALS. HYDROGEN COMPOUNDS. PHOSPHITES. ETHYL RADICALS. PHOSPHATES.) (*METAL COATINGS FOR *METALS. MANUFACTURING METHODS. PROCESSING. PHOSPHATE COATINGS. CERAMIC COATINGS. SILICN COMPOUNDS. DIOXIDES. TEMPERATURE. RESISTANC. *WEATHERPROOFING. HARDNESS. AGING.)

***METAL FILMS**

AD-272 675 62-2-4 DIV. 8
AERONAUTICAL ELECTRONIC AND ELECTRICAL LAB.. NAVAL AIR DEVELOPMENT CENTER. JOHNSVILLE. PA.
(MEMORY DEVICES. *MAGNETIC TAPE. *THIN FILMS.) (*METAL FILMS. MAGNETIC PROPERTIES.)

***METAL FORMING PRESSES**

AD-272 852 62-2-4 DIV. 30
AMERICAN MACHINE AND FOUNDRY CO.. NILES. ILL.
(*METAL FORMING PRESSES. *EXTRUSION. *CONTAINERS. CYLINDRICAL BODIES. FAILURE (MECHANICS). *NON-DESTRUCTIVE TESTING. ULTRASONICS. RADIOGRAPHY. SURFACES. ELECTROMAGNETIC FIELDS. MAGNETIC FIELDS. ELECTROMAGNETISM. FEASIBILITY STUDIES.) *BIBLIOGRAPHY.

***METAL PLATES**

AD-272 947 62-2-4 DIV. 25
AMERICAN MACHINE AND FOUNDRY CO.. NILES. ILL.
(*SOLID STATE PHYSICS. *TERMINAL BALLISTICS. *PENETRATION. *METAL PLATES. ARMOR PLATE. BODY ARMOR. PROJECTILES. IMPACT SHOCK. COMPRESSION SHOCK. SHOCK WAVES. ENERGY. MOTION. THEORY.) (THERMODYNAMICS. THERMAL STRESSES. IRREVERSIBLE PROCESSES. RELAXATION TIME.) MECHANICS. CONTINUUM MECHANICS. FRACTURE (MECHANICS). FATIGUE (MECHANICS). FAILURE (MECHANICS). PHYSICAL PROPERTIES. ELASTICITY. PLASTICITY. PLASTIC FLOW. STRESSES. DEFORMATION. LATTICES. EQUATIONS OF STATE. MATHEMATICAL ANALYSIS.

***METAL SEALS**

AD-272 888 62-2-4 DIV. 17
CHANCE VOUGHT CORP.. DALLAS. TEX.
(*ALUMINUM ALLOYS. FATIGUE (MECHANICS). STRESSES. CORROSION.) (NIOBIUM ALLOYS. DIFFUSION OF *CERAMIC COATINGS AS OXIDATION INHIBITORS.) (MAGNESIUM ALLOYS. CASTINGS. MECHANICAL PROPERTIES.) (HYDRAULIC SYSTEMS. METAL SEALS. *ALLOYS.) (NICKEL ALLOYS. SHEETS. *HEAT RESISTANT ALLOYS.) (*BLACKBODY RADIATION. ZIRCONIUM COMPOUNDS. OXIDES.) (*PHOTOELASTIC MATERIALS. COATINGS.) (*GLASS TEXTILES. AIRCRAFT CANOPIES.)

***METALLIC CRYSTALS**

AD-272 804 62-2-4 DIV. 25
DAVID SARNOFF RESEARCH CENTER. PRINCETON. N. J.
(*FERROMAGNETIC MATERIALS. SYNTHESIS. *METALLIC CRYSTALS. *CRYSTAL STRUCTURE. MAGNETIC PROPERTIES. *PHASE STUDIES. CYLINDRICAL BODIES. MAGNETIC MOMENTS. X-RAY DIFFRACTION ANALYSIS. MICROWAVE SPECTROSCOPY. MEASUREMENT.) (NICKEL COMPOUNDS. COPPER COMPOUNDS. ZINC COMPOUNDS. BARIUM COMPOUNDS LEAD COMPOUNDS. IRON COMPOUNDS. OXIDES.) (PARTICLES. SINTERING. TEMPERATURE.)

***METALORGANIC COMPOUNDS**

AD-272 761 62-2-4 DIV. 14
NEW YORK U. COLL. OF ENGINEERING. N. Y.
(*HEAT RESISTANT POLYMERS. POLYMERS. *METALORGANIC COMPOUNDS. RESINS. *EPOXY RESINS. *COATINGS. PIGMENTS. ADDITIVES. SYNTHESIS. HIGH TEMPERATURE RESEARCH. STABILITY. PYROLYSIS. DETERIORATION.) (COMPLEX COMPOUNDS. PROPYL RADICALS. *TITANATES. VINYL RADICALS. CYCLOHEXENES. DIOXIDES. TITANIUM COMPOUNDS. ZINC COMPOUNDS. ALUMINUM COMPOUNDS. SILICONES.) (STEEL. PLASTIC COATINGS.)

AD-272 949 62-2-4 DIV. 4
AEROSPACE CORP., LOS ANGELES, CALIF.
(*CARBONYL RADICALS AND *METAL-ORGANIC COMPOUNDS OF TRANSITION ELEMENTS; *HALOCARBONS; SYNTHESIS; CHEMICAL REACTIONS; METALATION; DISPLACEMENT REACTIONS; REDUCTION; GRIGNARD REACTIONS.) (POLYCYCLIC COMPOUNDS, PENTENES; CARBONYL RADICALS AND METALORGANIC COMPOUNDS OR NITROSO RADICALS OR SALTS OR HALIDES OR ALKYL RADICALS OR PHENYL RADICALS OR ANTIMONY COMPOUNDS AND HYDRIDES OR NITRILES OR PHOSPHINES OR ARSINES OR CYANO RADICALS.)

*METALS

AD-272 515 62-2-4 DIV. 26
WESTINGHOUSE ELECTRIC CORP., BLAIRSVILLE, PA.
(*MACHINE TOOLS; *METALS; *EXTRUSION; EXPLOSIVE FORMING; PNEUMATIC SYSTEMS; HYDRAULIC SYSTEMS.) (MANUFACTURIN METHODS; FEASIBILITY STUDIES; PROCESSING; STEEL; STAINLESS STEEL; TITANIUM ALLOYS; ALUMINUM ALLOYS; ALUMINUM; VANADIUM ALLOYS.) (DIES; TOOLS; DESIGN.) (PRESSURE; MOTION; DECELERATION; VELOCITY; INSTRUMENTATION.) AIRFRAMES; STRUCTURES; AIRCRAFT; SPACESHIPS

AD-272 693 62-2-4 DIV. 17
DEPARTMENT OF THE ARMY, WASH., D. C.
(*BIBLIOGRAPHY; *METALS; *EXPLOSIVE FORMING; SAFETY DEVICES; *ALLOYS REFRACTORY MATERIALS; HARDENING; WELDING; *MACHINING; THEORY; GAS IONIZATION; HEAT TRANSFER; SHOCK WAVES.)

AD-272 780 62-2-4 DIV. 14
SOUTHERN RESEARCH INST., BIRMINGHAM, ALA.
(*HEAT RESISTANT PAINTS; PREPARATION FROM METALLIC COMPOUNDS; METALORGANIC COMPOUNDS; ZINC COMPOUNDS; OXIDES; METHYL RADICALS; HYDROGEN COMPOUNDS; PHOSPHITES; ETHYL RADICALS; PHOSPHATES.) (*METAL COATINGS FOR *METALS; MANUFACTURING METHODS; PROCESSING; PHOSPHATE COATINGS; CERAMIC COATINGS; SILICN COMPOUNDS; DIOXIDES; TEMPERATURE; RESISTANC; *EATHERPROOFING; HARDNESS; AGING.)

AD-272 858 62-2-4 DIV. 17
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(*ALLOYS; *METALS WITH REINFORCING MATERIALS OF METALLIC TEXTILES.) (*ALUMINUM AND *ALUMINUM ALLOYS; *COPPER ALLOYS; POWDER ALLOYS OR POWDER METALS WITH FIBERS OF STAINLESS STEEL OR TUNGSTEN.) (POWDER METALLURGY; EXTRUSION; MECHANICAL PROPERTIES; TENSILE PROPERTIES; ELASTICITY; MICROSTRUCTURE; HARDENING.)

AD-272 986 62-2-4 DIV. 17
FRANKFORD ARSENAL, PHILADELPHIA, PA.
(*ALLOYS; *METALS; MILITARY REQUIREMENTS; STRUCTURES; *BEARINGS; HIGH PROPERTIES; HARDNESS.) (LEAD; TIN.) (TIN TEMPERATURE RESEARCH; DATA; MELTING; TENSIL ALLOYS; LEAD ALLOYS; ALUMINUM ALLOYS; CADMIUM ALLOYS; MAGNESIUM ALLOYS; ZINC ALLOYS; COPPR ALLOYS; ANTIMONY ALLOYS; SILVER ALLOYS; ARSENIC ALLOYS.)

*METEORITES

AD-272 994 62-2-4 DIV. 2
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
(*METEORITES; *COLLECTING METHODS; *SOUNDING ROCKETS.)

*METEOROLOGICAL DATA

AD-272 764 62-2-4 DIV. 2
MICHIGAN U. COLL. OF ENGINEERING, ANN ARBOR.
(*ATMOSPHERE; *METEOROLOGICAL DATA; COLLECTING METHODS; DENSITY; TEMPERATURE; BAROMETRIC PRESSURE; *SATELLITE VEHICLES.) (ATMOSPHERE; LIGHT; *REFRACTION; LIGHT TRANSMISSION; STARS.)

*METEOROLOGY

AD-272 632 62-2-4 DIV. 24
MORELL, W. E., ASSOCIATES, INC., LEXINGTON, MASS.
(*METEOROLOGY; *PHOTOGRAPHIC ANALYSIS OF *CLOUDS USING AERIAL CAMERAS; SURFACE TO AIR; CAMERA MOUNTS; STEREOSCOPES; MAPPING; EFFECTIVENESS; ERRORS FOR *IND; ATMOSPHERE; MOTION; SHEAR STRESSES; TESTS.)

AD-272 999 62-2-4 DIV. 30
TEXAS A. AND M. COLL., COLLEGE STATION.
(*OCEANOGRAPHY AND *METEOROLOGY; DATA; *INSTRUMENTATION FOR OCEANOGRAPHIC DATA; METEOLOGICAL DATA.) (ELECTRONIC EQUIPMENT; DATA TRANSMISSION SYSTEMS; DATA STORAGE SYSTEMS; POWER SUPPLIES; TELEMETERING SYSTEMS; *DATA PROCESSING SYSTEMS.) (WIND; BAROMETRIC PRESSURE; OCEAN CURRENTS; TEMPERATURE.) (TRANSDUCERS; ANEMOMETERS.) *FLORIDA.

*MICROMETEOROLOGY

AD-272 870 62-2-4 DIV. 2
ARMY ELECTRONIC PROVING GROUND, FORT HUACHUCA, ARIZ.
(ENERGY; ATMOSPHERE; TURBULENCE.) (SOILS; EVAPOTRANSPIRATION; ENERGY.) *MICROMETEOROLOGY.

*MICROSTRUCTURE

AD-272 771 62-2-4 DIV. 25
POMONA COLL., CLAREMONT, CALIF.
(*X-RAY SPECTROSCOPY; X RAYS; REFLECTION; ABSORPTION; DIFFRACTION; FLUORESCENCE; *SECONDARY EMISSION.) (X-RAY SPECTROSCOPY; CRYSTALS; CELLS (BIOLOGY).) (CRYSTALS *MICROSTRUCTURE; METALLIC CRYSTALS; ELECTRON DIFFRACTION ANALYSIS.)

*MICROWAVE AMPLIFIERS

AD-272 627 62-2-4 DIV. 8
WATKINS JOHNSON CO., PALO ALTO, CALIF.
(*KLYSTRONS; S BAND; ELECTRON TUBES; *MICROWAVE AMPLIFIERS; *POWER AMPLIFIERS; FEASIBILITY STUDIES.) (ELECTRODES; *ELECTRON GUNS; OPTICS; FOCUSING; SOLENOIDS MAGNETIC FIELDS; ELECTRON BEAMS; CATHODES (ELECTRON TUBES); ANODES (ELECTRON TUBES); HEATING; MODULATION; DESIGN; TESTS; TEST EQUIPMENT.)

AD-272 806 62-2-4 DIV. 8
STANFORD ELECTRONICS LABS., STANFORD U., CALI.
(*SOLID STATE PHYSICS; *ELECTRONICS; *SCIENTIFIC RESEARCH.) (*MICROWAVE OSCILLATORS; *MICROWAVE AMPLIFIERS; *MASERS; SWITCHING CIRCUITS; MATHEMATICAL ANALYSIS; *ELECTRONIC SWITCHES.) (*SEMICONDUCTORS; LATTICES; IONS.) (INFRARED SPECTROSCOPY; EXTREMELY HIGH FREQUENCY; MASERS; PARAMETRIC AMPLIFIERS.) (X BAND; CAVITY RESONATORS.) (SEMICONDUCTORS; SILICON; GERMANIUM; GALLIUM COMPOUNDS; ARSENIDES.) (DIGITAL SYSTEMS; DATA PROCESSING SYSTEMS; SOLID STATE PHYSIC.)

AD-272 887 62-2-4 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(DESIGN OF C BAND; *MICROWAVE AMPLIFIERS; *TUNED AMPLIFIERS.) (THEORY OF ULTRA HIGH FREQUENCY AMPLIFIERS.) (*DIODES USING SILICON; GALLIUM COMPOUNDS; ARSENIDES FOR USE IN C BAND; AMPLIFIERS.)

*MICROWAVE EQUIPMENT

AD-272 534 62-2-4 DIV. 8
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, *RIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*PHASE SHIFTERS; ULTRA HIGH FREQUENCY; FERRITES; MAGNETIC FIELDS; USSR.) (TRANSMISSION LINES; *MICROWAVE EQUIPMENT; *FERRITE CORES; *COAXIAL CABLES; HELIXES; DIELECTRICS; ATTENUATION; RADIO SIGNALS; RADIO TRANSMITTERS; RADIO RECEIVERS; MEASUREMENT.)

AD-272 872 62-2-4 DIV. 25
MICROWAVE LAB., STANFORD U., CALIF.
(*FEASIBILITY STUDIES AND ABSTRACTING OF SCIENTIFIC RESEARCH ON *MICROWAVE EQUIPMENT AND *PLASMA PHYSICS.) RESEARCH PROGRAM ADMINISTRATION.

*MICROWAVE OSCILLATORS

AD-272 806 62-2-4 DIV. 8
STANFORD ELECTRONICS LABS., STANFORD U., CALI.
(*SOLID STATE PHYSICS; *ELECTRONICS; *SCIENTIFIC RESEARCH.) (*MICROWAVE OSCILLATORS; *MICROWAVE AMPLIFIERS; *MASERS; SWITCHING CIRCUITS; MATHEMATICAL ANALYSIS; *ELECTRONIC SWITCHES.) (*SEMICONDUCTORS; LATTICES; IONS.) (INFRARED SPECTROSCOPY; EXTREMELY HIGH FREQUENCY; MASERS; PARAMETRIC AMPLIFIERS.) (X BAND; CAVITY RESONATORS.) (SEMICONDUCTORS; SILICON; GERMANIUM; GALLIUM COMPOUNDS; ARSENIDES.) (DIGITAL SYSTEMS; DATA PROCESSING SYSTEMS; SOLID STATE PHYSIC.)

*MICROWAVE PROBES

AD-272 789 62-2-4 DIV. 9
GUGGENHEIM JET PROPULSION CENTER, CALIF. INST. OF TECH., PASADENA.
(*GAS IONIZATION AND TRANSPORT PROPERTIES OF *GAS FLOW BY *MICROWAVE PROBES; ELECTRON BEAMS.) (RELIABILITY; TESTS AND MEASUREMENT OF SHOCK WAVES IN ARGON.) (INSTRUMENTATION AND EXPERIMENTAL DATA.)

*MICROWAVES

AD-272 598 62-2-4 DIV. 8
BROWN U., PROVIDENCE, R. I.
(*ANTENNAS; *ANTENNA RADIATION PATTERNS; ATMOSPHERICS; TURBULENCE.) (*MICROWAVES; PROPAGATION; REFRACTIVE INDEX; GEOMETRY; OPTICS.) (INTEGRAL TRANSFORMS, PARTIAL DIFFERENTIAL EQUATIONS; STATISTICAL FUNCTIONS; ALGEBRAS.)

AD-272 605 62-2-4 DIV. 25
COLUMBIA RADIATION LAB., NEW YORK.
(*MICROWAVES; MICROWAVE FREQUENCY; MICROWAVE NETWORKS; MICROWAVE SPECTROSCOPY.) (MEASUREMENT OF HYPERFINE STRUCTURE OF LITHIUM IONS.) (ZINC; CADMIUM; ISOTOPES; RADIOACTIVE ISOTOPES.) (SIMULATION OF PLANETARY ATMOSPHERES FOR MEASUREMENT OF ELECTROMAGNETIC PROPERTIES.) (*MEASUREMENT; HYDROXIDES; FREE RADICALS.) CRYOGENICS; MASERS; SOLID STATE PHYSICS; NUCLEAR PHYSIC; MOLECULES; RADIO ASTRONOMY; *ELECTROMAGNETI WAVES.

*MILITARY INTELLIGENCE

AD-272 991 62-2-4 DIV. 28
ADJUTANT GENERAL, DEPT. OF THE ARMY, WASHINGTON, D. C.
(*MILITARY INTELLIGENCE; PHOTOGRAPHIC INTELLIGENCE; RELIABILITY; ERRORS; STANDARDIZATION; FEASIBILITY STUDIES.)

*MILITARY OPERATIONS

AD-272 845 62-2-4 DIV. 18
PLANNING RESEARCH CORP., LOS ANGELES, CALIF.
(*MILITARY OPERATIONS; *AIR FORCE OPERATIONS; DISPLAY SYSTEMS; DATA PROCESSING SYSTEMS; COMMAND SYSTEMS; CONTROL SYSTEMS; WARFARE; SIMULATION; *TEST FACILITIES; LABORATORY EQUIPMENT; HUMAN ENGINEERING; COSTS; *OPERATIONS RESEARCH.)

*MILITARY PERSONNEL

AD-272 975 62-2-4 DIV. 23
PSYCHOLOGICAL RESEARCH ASSOCIATES, INC., ARLINGTON, VA.
(*MILITARY PERSONNEL; *WEAPONS; HANDLING.) (*JOB ANALYSIS; EFFECTIVENESS; *ACHIEVEMENT TESTS.)

*MINE DETECTORS

AD-272 838 62-2-4 DIV. 8
GOODYEAR AIRCRAFT CORP., AKRON, OHIO.
(*MAGNETIC DETECTORS; *MINE DETECTORS; DESIGN.) (*OPTICAL FILTERS; CORRELATION TECHNIQUES; FEASIBILITY STUDIES; MATHEMATICAL ANALYSIS.) (CATHODE RAY TUBES; DISPLAY SYSTEMS; PHOTOGRAPHIC RECORDING SYSTEMS.)

AD-272 861 62-2-4 DIV. 8
GOODYEAR AIRCRAFT CORP., AKRON, OHIO.
(*MAGNETIC DETECTORS; ELECTROMAGNETIC FIELDS; MAGNETIC FIELDS; *MINE DETECTORS; SIGNALS; FEASIBILITY STUDIES.) (MAGNETIC DETECTORS; SIGNALS; NONLINEAR SYSTEMS; ELECTRICAL NETWORKS; DIFFERENTIATING CIRCUITS.)

*MOLECULAR ASSOCIATION

AD-272 561 62-2-4 DIV. 17
COLUMBIA U., NEW YORK.
(*COPPER ALLOYS; *GOLD ALLOYS; *PHASE STUDIES; PHASE TRANSITIONS; COPPER COMPOUNDS; GOLD COMPOUNDS; *MOLECULAR ASSOCIATION; *RESISTANCE; ELECTRICAL PROPERTIES; THERMOELECTRICITY; MECHANICAL PROPERTIES; ELASTICITY; HIGH TEMPERATURE RESEARCH; THEORY.)

*MOLECULAR SPECTROSCOPY

AD-272 574 62-2-4 DIV. 25
INSTITUTE FOR MOLECULAR PHYSICS, U. OF MARYLAND, COLLEGE PARK.
(*QUANTUM MECHANICS; ENERGY BY *MOLECULAR SPECTROSCOPY AND VIBRATION; MEASREMENT.) (MATHEMATICAL ANALYSIS; *PERTURBATION THEORY; OPERATORS (MATHEMATICS).)

*MOLYBDENUM

AD-272 778 62-2-4 DIV. 17
SYLVANIA ELECTRIC PRODUCTS, INC., TOWANDA, PA.
(PRODUCTION; *MOLYBDENUM; *MOLYBDENUM ALLOYS; TITANIUM ALLOYS; CARBON ALLOYS; SHEETS; *POWDER METALLURGY.) (CONTROLLED ATMOSPHERES; *SINTERING; HYDROGEN DISSOCIATION; AMMONIA; TEMPERATURE; VACUUM FURNACES; TENSILE PROPERTIES.) (ADDITIVES; NITROGEN; OXYGEN; CARBON; TITANIUM COMPOUNDS; CARBIDES; OXIDES; NITHIDES.) ALLOYS; HEAT RESISTANT ALLOYS; PROCESSING; POWDER ALLOYS; POWDER METALS; HARDENING.

*MOLYBDENUM ALLOYS

AD-272 526 62-2-4 DIV. 26
MCDONNELL AIRCRAFT CORP., ST. LOUIS, MO.
(*MOLYBDENUM ALLOYS; TITANIUM ALLOYS; ZIRCONIUM ALLOYS; SHEETS; *NIOBIUM; RIVETS; BOLTS; NUTS (MECHANICS)).) (METAL JOINTS; BOLTED JOINTS; RIVETED JOINTS; *COATINGS; METAL COATINGS; ANTIOXIDANTS; SILICON COATINGS; REFRACTORY COATINGS; ALUMINUM COATINGS; CHROMIUM COMPOUNDS; NIOBIUM; MOLYBDENUM.) (TEMPLATES; CHEMICAL MILLING; FORGING.) (HIGH TEMPERATURE RESEARCH; STRUCTURES; SPACESHIPS; AIRFRAMES; DESIGN.)

AD-272 778 62-2-4 DIV. 17
SYLVANIA ELECTRIC PRODUCTS, INC., TOWANDA, PA.
(PRODUCTION; *MOLYBDENUM;

*MOLYBDENUM ALLOYS; TITANIUM ALLOYS; CARBON ALLOYS; SHEETS; *POWDER METALLURGY.) (CONTROLLED ATMOSPHERES; *SINTERING; HYDROGEN; DISSOCIATION; AMMONIA; TEMPERATURE; VACUUM FURNACES; TENSILE PROPERTIES.) (ADDITIVES; NITROGEN; OXYGEN; CARBON; TITANIUM COMPOUNDS; CARBIDES; OXIDES; NITRIDES.) ALLOYS; HEAT RESISTANT ALLOYS; PROCESSING; POWDER ALLOYS; POWDER METALS; HARDENING.

AD-272 993 62-2-∞ DIV. 17
ARMOUR RESEARCH FOUNDATION; CHICAGO; ILL.
(ALLOYS; METALS; *POWDER ALLOYS; POWDER METALS; *MOLYBDENUM ALLOYS; TITANIUM ALLOYS; CARBON ALLOYS; PROCESSING.) (PREPARATION BY MAGNESIUM; REDUCTION AND EXTRUSION FROM MIXTURES; MOLYBDENUM COMPOUNDS; TITANIUM COMPOUNDS; CARBON COMPOUNDS; CHLORIDES.) (LABORATORY EQUIPMENT; DESIGN; OPERATION.)

*MONITORS

AD-272 915 62-2-4 DIV. 28
HUMAN FACTORS RESEARCH; INC.; LOS ANGELES; CALIF.
*DISPLAY SYSTEMS; *MONITORS; AUDITORY SIGNALS; VISUAL SIGNALS; DETECTION; ATTENTION; REACTION (PSYCHOLOGY); REACTION TIME; BEHAVIOR; VISUAL PERCEPTION; AUDITORY PERCEPTION; *HUMAN ENGINEERING; THEORY.

*MONOMOLECULAR FILMS

AD-272 579 62-2-4 DIV. 4
NAVAL RESEARCH LAB.; WASHINGTON; D. C.
(THIN FILMS; *MONOMOLECULAR FILMS; FLUORIDES; *FATTY ACIDS; FLUORINATION; *WETTING AGENTS; *ADSORPTION; SURFACES; CHROMIUM; PLATINUM; NICKEL; QUARTZ; GLASS.) (STEREOCHEMISTRY; DIPOLE MOMENTS; CHEMICAL BONDS; THEORY.)

*MONOXIDES

AD-272 881 62-2-4 DIV. 9
THOMPSON RAMO *WOOLDRIDGE; INC.; CLEVELAND; OHIO.
(SUBMARINES; CONTROLLED ATMOSPHERES; *OXIDATION-REDUCTION REACTIONS REDUCTION; CHEMICAL REACTIONS; *CARBON DIOXIDE; *CARBON COMPOUNDS; *MONOXIDES; HYDROGEN; CATALYSTS; CARBON DEPOSITS; TEMPERATURE; GASES; MOISTURE.) (CATALYSIS; ELECTROLYSIS; CHEMICAL EQUILIBRIUM; REACTION KINETICS; THERMOCHEMISTRY; THERMODYNAMICS.)

*MOON

AD-272 573 62-2-4 DIV. 2
MANCHESTER U. (GT. BRIT.).
(*MOON; MINERALS; LUMINESCENCE; *SPECTROGRAPHIC ANALYSIS; POLARIZATION; MEASUREMENT.) (*SPECTROPHOTOMETERS; POLARISCOPS; DESIGN; PHOTOMULTIPLIERS.)

AD-272 575 62-2-4 DIV. 2
MANCHESTER U. (GT. BRIT.).
(*MOON; TERRAIN; PHOTOGRAPHIC ANALYSIS.)

*MORTARS

AD-272 811 62-2-4 DIV. 22
ATLANTIC RESEARCH CORP.; ALEXANDRIA; VA.
(TESTS OF *MORTARS.) (INSTRUMENTATION; STRAIN GAGES; CALIBRATION; ACCELEROMETERS.)

*MOTION

AD-272 830 62-2-4 DIV. 12
LINCOLN LAB.; MASS. INST. OF TECH.; LEXINGTON.
(*SATELLITE VEHICLES; SPACE FLIGHT; *MOTION; ORBITAL FLIGHT PATHS.) (PERTURBATION THEORY; AERODYNAMICS; DRAG; TERRESTRIAL MAGNETISM; MAGNETIC FIELDS; GRAVITY; METEORITES; HAZARDS; TORQUE.) *BIBLIOGRAPHY.

***NAVAL VESSELS**

AD-272 985 62-2-4 DIV. 31
DAVID TAYLOR MODEL BASIN, WASHINGTON, D. C.
(*NAVAL VESSELS FOR LAUNCHING, *GUIDED MISSILES, *SHIP HULLS, VIBRATION, TESTS.) (*CARGO SHIPS, *MERCHANT VESSELS, SHIP HULLS, VIBRATION, TESTS.)

***NEBULAE**

AD-272 589 62-2-4 DIV. 2
HAMBURGER STERNWARTE (GERMANY).
(*NEBULAE, PHOTOGRAPHIC ANALYSIS, SPECTROGRAPHIC ANALYSIS.) (BRIGHTNESS, IONIZATION, HYDROGEN, HELIUM, STARS, MONOCHROMATIC LIGHT.) ASTROPHYSICS.

***NEUTRON CROSS SECTIONS**

AD-272 809 62-2-4 DIV. 20
UNITED NUCLEAR CORP., WHITE PLAINS, N. Y.
(*NEUTRON CROSS SECTIONS, *TITANIUM, *POTASSIUM, *MAGNESIUM, *NITROGEN, ALUMINUM, SILICON, SODIUM, OXYGEN.) (NEUTRONS, SCATTERING, GAMMA RAYS.) TABLES.

***NEUTRON FLUX DENSITY**

AD-272 535 62-2-4 DIV. 20
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*RESEARCH REACTORS, PULSE TRANSMITTERS, FAST REACTORS, CRITICAL ASSEMBLIES, SUPERCRITICAL ASSEMBLIES, NEUTRONS, *NEUTRON FLUX DENSITY, *FISSION NEUTRONS, HEAT TRANSFER, FISSION PRODUCTS, NUCLEAR ENERGY.) USSR.

AD-272 918 62-2-4 DIV. 20
GENERAL DYNAMICS/FORT WORTH, TEX.
(*ELASTIC SCATTERING AND *TRANSPORT PROPERTIES OF NUCLEAR REACTIONS IN WATER.) (SHIELDING, NEUTRONS, *NEUTRON FLUX DENSITY, NUCLEI, FISSION, NUCLEAR ENERGY.) (DIFFERENTIAL CROSS SECTION, DIFFERENTIAL GEOMETRY, OPERATORS (MATHEMATICS), POLYNOMIALS, FUNCTIONS.) *TABLES.

***NEUTRONS**

AD-272 546 62-2-4 DIV. 20
AIR FORCE SPECIAL WEAPONS CENTER, KIRTLAND AIR FORCE BASE, N. MEX.
(NUCLEAR EXPLOSIONS, NEUTRON SCATTERING, HIGH ALTITUDE, *NEUTRONS, NEUTRON FLUX DENSITY, DENSITY, MEASUREMENT.) (NUCLEAR EXPLOSIONS, NEUTRONS, *PROPAGATION THROUGH ATMOSPHERE.)

AD-272 607 62-2-4 DIV. 25
KJELLER RESEARCH ESTABLISHMENT (NORWAY).
(*INELASTIC SCATTERING OF *NEUTRONS IN CRYSTALS OF MAGNETITE, COBALT, POLARIZATION, ELECTRON BEAMS, DIFFRACTION, *NUCLEAR RESONANCE, NUCLEAR SPINS.) (PULSE ANALYZERS, ELECTROMAGNETS, MIRRORS, MAGNETOMETERS, INSTRUMENTATION, VACUUM FURNACES, NEUTRON CRYSTAL SPECTROMETERS.)

***NIOBIUM**

AD-272 779 62-2-4 DIV. 17
SOUTHERN RESEARCH INST., BIRMINGHAM, ALA.
(*STAINLESS STEEL, HEATING, HIGH TEMPERATURE RESEARCH, LOADING, THERMODYNAMICS.) (*NIOBIUM, *TANTALUM, AGING, DEFORMATION, ELASTICITY, FRACTURE (MECHANICS).) (*SHEETS, HEAT TREATMENT, STRESSES, TENSILE PROPERTIES, MECHANICAL PROPERTIES, FAILURE (MECHANICS), THEORY, MATHEMATICAL ANALYSIS, TEST METHODS.) (AIRCRAFT, MATERIALS, REFRACTORY MATERIALS.)

***NITRO RADICALS**

AD-272 666 62-2-4 DIV. 7
RAUIO CORP. OF AMERICA, SOMERVILLE, N. J.
(*PRIMARY BATTERIES, WET CELL, *MAGNESIUM ALLOYS, *NITRO RADICALS, *ORGANIC COMPOUNDS, THEORY, ELECTROCHEMISTRY,) (CATHODES (ELECTROLYTIC CELL), CARBON, BENZENES, NITRO RADICALS, HETEROCYCLIC COMPOUNDS, PYRIDINES, PYRIMIDINES, FURAN, THIOPHENES,) (ELECTROLYTES, MAGNESIUM COMPOUNDS, PERCHLORATES, BROMIDES,) (ANODES (ELECTROLYTIC CELL), MAGNESIUM ALLOYS,)

***NITROCELLULOSE**

AD-272 677 62-2-4 DIV. 14
AERONAUTICAL MATERIALS LAB., NAVAL AIR MATERIAL CENTER, PHILADELPHIA, PA.
(*VARNISHES, *AIRCRAFT FINISHES FOR NAVAL AIRCRAFT, CONTROL SURFACES, THIN FILMS, *ACRYLIC RESINS, *NITROCELLULOSE, THICKNESS, RESISTANCE TO THERMAL RADIATION, NUCLEAR EXPLOSIONS,) (TESTS, REFLECTION, ADHESION, IMPACT SHOCK, FATIGUE (MECHANICS), CLIMATIC FACTORS,) MILITARY REQUIREMENTS, SPECTROPHOTOMETERS.

***NON-LINEAR DIFFERENTIAL EQUATIONS**

AD-272 559 62-2-4 DIV. 12
RAND CORP., SANTA MONICA, CALIF.
(*SPACESHIPS, THRUST, *EARTH O *MARS, FLIGHT PATHS, PROPULSION, THEORY,) (*CONTROL SYSTEMS, *NON-LINEAR DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS, MATRIX ALGEBRA, VECTOR ANALYSIS, TRANSFORMATIONS (MATHEMATICS), INEQUALITIES,)

***NOSE FUZES**

AD-272 678 62-2-4 DIV. 22
HARVEY ALUMINUM SALES, INC., TORRANCE, CALIF.
(*BOMB FUZES, *NOSE FUZES, TAIL FUZES, TIME DELAY FUZES, IMPACT FUZES, FUZES, DESIGN, PRODUCTION, TESTS.)

***NUCLEAR ENERGY LEVELS**

AD-272 843 62-2-4 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
(SOLID STATE PHYSICS, *MASERS IN PARAMAGNETIC CRYSTALS, *PARAMAGNETIC RESONANCE,) (*RUBY, CRYSTAL STRUCTURE, LATTICS, *RELAXATION TIME, NUCLEAR SPINS, POLARIZATION,) (QUANTUM MECHANICS, *NUCLEAR ENERGY LEVELS, ELECTROMAGNETIC FIELDS,) (TESTS AN MEASUREMENT BY INSTRUMENTATION, KLYSTRONS, OSCILLOSCOPES, PULSE GENERATORS, WAVEMETERS,)

***NUCLEAR EXPLOSIONS**

AD-272 598 62-2-4 DIV. 22
BROADVIEW RESEARCH CORP., BURLINGAME, CALIF.
(ROX, *EXPLOSIONS, *BLAST, *SHOCK WAVES, *PRESSURE, MEASUREMENT, PRESSURE GAGES, TERRAIN, CONFIGURATION, TERRAIN MODELS, MODEL TESTS, TEST EQUIPMENT,) (*NUCLEAR EXPLOSIONS, SIMULATION,)

***NITROGEN**

AD-272 583 62-2-4 DIV. 25
OBSERVATOIRE DE PARIS-MEUDON (FRANCE).
(*NITROGEN, *GLOW DISCHARGES, IONS, ELECTRONS,) (*RECOMBINATION REACTIONS, TRANSPORT PROPERTIES, EXCITATION, INFRARED RADIATION, DISSOCIATION, ULTRAVIOLET RADIATION,) (DISTRIBUTION THEORY, PROBABILITY, SPECTROGRAPHIC DATA, PHOTOMETERS,)

AD-272 809 62-2-4 DIV. 20
UNITED NUCLEAR CORP., WHITE PLAINS, N. Y.
(*NEUTRON CROSS SECTIONS, *TITANIUM, *POTASSIUM, *MAGNESIUM, *NITROGEN, ALUMINUM, SILICON, SODIUM, OXYGEN,) (NEUTRONS, SCATTERING, GAMMA RAYS,) TABLES.

AD-272 868 62-2-4 DIV. 25
APPLIED PHYSICS LAB., JOHNS HOPKINS U., SILVER SPRING, MD.
(*NITROGEN, *CARBON DIOXIDE, MIXTURES, GASES, HIGH TEMPERATURE RESEARCH, *THERMAL CONDUCTIVITY, THERMODYNAMICS, GAS FLOW, THEORY, TEST METHODS,)

***NOISE (RADIO)**

AD-272 653 62-2-4 DIV. 8
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
(*BACKWARD-WAVE AMPLIFIERS, *MAGNETRONS, RADIOFREQUENCY AMPLIFIERS, ELECTROMAGNETIC WAVES, WAVE TRANSMISSION, ELECTRON GUNS, ELECTRON BEAMS, TRANSFORMATIONS (MATHEMATICS), *NOISE (RADIO), PERTURBATION THEORY, MATRIX ALGEBRA, INTEGRAL EQUATIONS, THEORY, MEASUREMENT,)

AD-272 659 62-2-4 DIV. 8
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
(NUMERICAL ANALYSIS OF HIGH FREQUENCY, *NOISE (RADIO) AT CATHODES (ELECTRON TUBES),) (NUMERICAL METHODS AND PROCEDURES FOR ANALYSIS OF NOISE (RADIO) IN *DIODES,) (DIODES, SPACE CHARGES, THERMIONIC EMISSION,)

***NON-DESTRUCTIVE TESTING**

AD-272 952 62-2-4 DIV. 30
AMERICAN MACHINE AND FOUNDRY CO., NILES, ILL.
(*METAL FORMING PRESSES, *EXTRUSION, *CONTAINERS, CYLINDRICAL BODIES, FAILURE (MECHANICS), *NON-DESTRUCTIVE TESTING, ULTRASONICS, RADIOGRAPHY, SURFACES, ELECTROMAGNETIC FIELDS, MAGNETIC FIELDS, ELECTROMAGNETISM, FEASIBILITY STUDIES,) *BIBLIOGRAPHY.

AD-272 989 62-2-4 DIV. 22
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(*NON-DESTRUCTIVE TESTING, *RADIOACTIVE ISOTOPES, GAMMA RAYS, DETECTION, NEUTRON DETECTORS FOR QUALITY CONTROL, WIRE, *SPRINGS, *PROJECTILE FUZES, *FUZES,)

***NUCLEAR MAGNETIC RESONANCE**

AD-272 637 62-2-4 DIV. 25
CLARENDON LAB., U. OF OXFORD (ST. BRIT.),
(*HELIUM, ISOTOPES, SOLIDS, LIQUIDS, MAGNETIC PROPERTIES, *NUCLEAR MAGNETIC RESONANCE, NUCLEAR SPIN, RELAXATION TIME, CRYOGENICS, HIGH PRESSURE RESEARCH, LABORATORY EQUIPMENT, RADIOFREQUENCY, MEASUREMENT,)

***NUCLEAR POWER PLANTS**

AD-272 836 62-2-4 DIV. 25
AVCO RESEARCH LAB., EVERETT, MASS.
(*MAGNETOHYDRODYNAMICS, GENERATORS IN *NUCLEAR PROPULSION,) (ROCKET PROPULSION, *ROCKET PROPELLANTS, *NUCLEAR POWER PLANTS, DESIGN,) (THERMODYNAMICS, HEAT TRANSFER, ENTROPY, HEAT EXCHANGERS, THRUST AUGMENTOR NOZZLES,)

***NUCLEAR PROPULSION**

AD-272 836 62-2-4 DIV. 25
AVCO RESEARCH LAB., EVERETT, MASS.
(*MAGNETOHYDRODYNAMICS, GENERATORS IN *NUCLEAR PROPULSION,) (ROCKET PROPULSION, *ROCKET PROPELLANTS, *NUCLEAR POWER PLANTS, DESIGN,) (THERMODYNAMICS, HEAT TRANSFER, ENTROPY, HEAT EXCHANGERS, THRUST AUGMENTOR NOZZLES,)

***NUCLEAR RESONANCE**

AD-272 607 62-2-4 DIV. 25
KJELLER RESEARCH ESTABLISHMENT (NORWAY).
(*INELASTIC SCATTERING OF *NEUTRONS IN CRYSTALS OF MAGNETITE, COBALT, POLARIZATION, ELECTRON BEAMS, DIFFRACTION, *NUCLEAR RESONANCE, NUCLEAR SPINS,) (PULSE ANALYZERS, ELECTROMAGNETS, MIRRORS, MAGNETOMETERS, INSTRUMENTATION, VACUUM FURNACES, NEUTRON CRYSTAL SPECTROMETERS,)

***OPTICAL FILTERS**

AD-272 838 62-2-4 DIV. 6
GOODYEAR AIRCRAFT CORP., AKRON, OHIO.
(*MAGNETIC DETECTORS, *MINE DETECTORS, DESIGN,) (*OPTICAL FILTERS, CORRELATION TECHNIQUES, FEASIBILITY STUDIES, MATHEMATICAL ANALYSIS,) (CATHODE RAY TUBES, DISPLAY SYSTEMS, PHOTOGRAPHIC RECORDING SYSTEMS,)

***OPTICAL IMAGES**

AD-272 774 62-2-4 DIV. 16
RUTGERS U., NEW BRUNSWICK, N. J.
(*RETINA, *COLOR VISION, RECOGNING DEVICES,) (*EYE, PHYSIOLOGY, SENSITIVITY, STIMULATION, VISUAL THRESHOLD, MONOCHROMATIC LIGHT,) (*OPTICAL IMAGES, MEASUREMENT,)

***OPTICAL INSTRUMENTS**

AD-272 801 62-2-4 DIV. 30
RANDOLPH-MACON COLL., ASHLAND, VA.
(*ELECTROMAGNETIC FIELDS, *HAZARDS, ORDNANCE,) (*OPTICAL INSTRUMENTS, *DETECTORS, *THERMAL RADIATION,) (ELECTRIC DETONATORS, ELECTRIC IGNITERS, THERMAL RADIATION, MEASUREMENT,) (DIAPHRAGMS (MECHANICS), TESTS, TEST EQUIPMENT, MATERIALS, PNEUMATIC DEVICES,) (GLASS TEXTILES, OPTICS,)

***OCEANOGRAPHY**

AD-272 999 62-2-4 DIV. 30
TEXAS A. AND M. COLL., COLLEGE STATION.
(*OCEANOGRAPHY AND *METEOROLOGY, DATA, *INSTRUMENTATION FOR OCEANOGRAPHIC DATA, METEOLOGICAL DATA,) (ELECTRONIC EQUIPMENT, DATA TRANSMISSION SYSTEMS, DATA STORAGE SYSTEMS, POWER SUPPLIES, TELEMETERING SYSTEMS, *DATA PROCESSING SYSTEMS,) (WIND, BAROMETRIC PRESSURE, OCEAN CURRENTS, TEMPERATURE,) (TRANSDUCERS, ANEMOMETERS,) *FLORIDA.

***OPERATIONS RESEARCH**

AD-272 845 62-2-4 DIV. 18
PLANNING RESEARCH CORP., LOS ANGELES, CALIF.
(*MILITARY OPERATIONS, *AIR FORCE OPERATIONS, DISPLAY SYSTEMS, DATA PROCESSING SYSTEMS, COMMAND SYSTEMS, CONTROL SYSTEMS, *WARFARE, SIMULATION, *TEST FACILITIES, LABORATORY EQUIPMENT, HUMAN ENGINEERING, COSTS, *OPERATIONS RESEARCH,)

AD-272 939 62-2-4 DIV. 6
ADVANCED ELECTRONICS CENTER, GENERAL ELECTRIC CO., ITHACA, N. Y.
(*TARGET RECOGNITION, *OPERATIONS RESEARCH, *DETECTION, FEASIBILITY STUDIES,) (SEQUENTIAL ANALYSIS, STATISTICAL PREDICTION, LINEAR SYSTEMS,) COMPUTERS, ANALYSIS, STATISTICAL TESTS, MATHEMATICAL

***ORBITAL FLIGHT PATHS**

AD-272 859 62-2-4 DIV. 30
AIR FORCE SPECIAL WEAPONS CENTER, KIRTLAND AIR FORCE BASE, N. MEX.
(*PROGRAMMING, *COMPUTERS, *SPACE PROBES, BOOSTER ROCKETS, *ORBITAL FLIGHT PATHS, VELOCITY.) (GEODESICS, *CELESTIAL MECHANICS, TIME, AZIMUTH, CELESTIAL NAVIGATION, PERTURBATION THEORY, GRAVITY.)

AD-272 869 62-2-4 DIV. 12
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(*SATELLITES AND *SATELLITE VEHICLES IN *ORBITAL FLIGHT PATHS AROUND THE CELESTIAL MECHANICS, EARTH.) (TRANSFORMATIONS (MATHEMATICS), TAYLOR'S SERIES, MATRIX ALGEBRA, PARTIAL DIFFERENTIAL EQUATIONS.)

AD-272 904 62-2-4 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*SATELLITE VEHICLE RESEARCH, MOTION AND *ORBITAL FLIGHT PATHS OF SATELLITE VEHICLES.) (*CELESTIAL MECHANICS, HARMONIC ANALYSIS, TRANSFORMATIONS (MATHEMATICS), POLYNOMIALS, PARTIAL DIFFERENTIAL EQUATIONS.)

AD-272 950 62-2-4 DIV. 12
AEROSPACE CORP., LOS ANGELES, CALIF.
(MATHEMATICAL ANALYSIS OF *SATELLITE VEHICLES, INJECTION INTO *ORBITAL FLIGHT PATHS ABOUT EARTH A HIGH ALTITUDE.) (EXTERIOR BALLISTICS, CELESTIAL MECHANICS.)

***ORGANIC COMPOUNDS**

AD-272 666 62-2-4 DIV. 7
RADIO CORP. OF AMERICA, SOMERVILLE, N. J.
(*PRIMARY BATTERIES, WET CELL, *MAGNESIUM ALLOYS, *NITRO RADICALS, *ORGANIC COMPOUNDS, THEORY, ELECTROCHEMISTRY.) (CATHODES (ELECTROLYTIC CELL), CARBON, BENZENES, NITRO RADICALS, HETEROCYCLIC COMPOUNDS, PYRIDINES, PYRIMIDINES, FURAN, THIOPHENES.) (ELECTROLYTES, MAGNESIUM COMPOUNDS, PERCHLORATES, BROMIDES.) (ANODES (ELECTROLYTIC CELL), MAGNESIUM ALLOYS.)

***ORGANIC MATERIALS**

AD-272 592 62-2-4 DIV. 10
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS., ARMY CHEMICAL CENTER, MD.
(*MATERIALS, *ORGANIC MATERIAS, *CERAMIC MATERIALS, INORGANIC SUBSTANCES, *FIBERS, PRODUCTION, SYNTHESIS, MANUFACTURING METHODS.) (METALORGANIC COMPOUNDS, *POLYMER, *PLASTICS, HEAT RESISTANT POLYMERS, RESINS, LAMINATES, COATINGS, ADHESIVES.) (*SYNTHETIC FIBERS, TEXTILES.) (METALS, ALLOYS.) (TOXICITY, HAZARDS.) (RADIATION EFFECTS, SPACE ENVIRONMENTAL CONDITIONS, GUIDED MISSILES.) SOLID ROCKET PROPELLANTS, *BIBLIOGRAPHY.

***OSCILLATORS**

AD-272 912 62-2-4 DIV. 8
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
(ANALYSIS OF NONLINEAR SYSTEMS, *ELECTRONIC EQUIPMENT, *OSCILLATORS, TRANSISTORS, DIODES.) (*ELECTRICAL NETWORKS, RESISTANCE, COILS, VACUUM TUBE AMPLIFIERS.) (*HARMONIC ANALYSIS, BESSEL FUNCTIONS, TRANSFORMATIONS (MATHEMATICS), FOURIER ANALYSIS, DIFFERENTIAL EQUATIONS.)

***OXIDATION-REDUCTION REACTIONS**

AD-272 881 62-2-4 DIV. 4
THOMPSON RAMO WOOLDRIDGE, INC., CLEVELAND, OHIO.
(SUBMARINES, CONTROLLED ATMOSPHERES, *OXIDATION-REDUCTION REACTIONS REDUCTION, CHEMICAL REACTIONS, *CARBON DIOXIDE, *CARBON COMPOUNDS, *MONOXIDES, HYDROGEN, CATALYSTS, CARBON DEPOSITS, TEMPERATURE, GASES, MOISTURE.) (CATALYSIS, ELECTROLYSIS, CHEMICAL EQUILIBRIUM, REACTION KINETICS, THERMOCHEMISTRY, THERMODYNAMICS.)

***OXIDES**

AD-272 684 62-2-4 DIV. 16
DENTAL RESEARCH FACILITY, NAVAL TRAINING CENTER, GREAT LAKES, ILL.
(DENTAL RESEARCH, *DENTAL MATERIALS, *ZINC COMPOUNDS, *OXIDES, *PHOSPHATES, *SILVER ALLOYS, *SILICATES.)

AD-272 835 62-2-4 DIV. 25
CINCINNATI U., OHIO.
(*CERAMIC MATERIALS, *REFRACTORY MATERIALS, *THERMODYNAMICS, HIGH TEMPERATUR RESEARCH, CRYSTALS, LATTICES.) (ELECTROLYTC CELLS, IRON COMPOUNDS, OXIDES, ELECTRIC POTENTIAL.) (*CHROMIUM COMPOUNDS AND *ZIRCONIUM COMPOUNDS, *OXIDES.) (CHROMIUM ALLOYS, NICKEL ALLOYS.) (THEORY, *PHASE STUDIES, X-RAY DIFFRACTION ANALYSIS, METALLURGICAL ANALYSIS.)

***OXYGEN**

AD-272 606 62-2-4 DIV. 25
HAWAII INST. OF GEOPHYSICS, HONOLULU.
(*ABSORPTION OF *OXYGEN IN ULTRAVIOLET RADIATION, VACUUM SYSTEMS, GAS IONIZATION.) (PHOTOMULTIPLIERS, PHOTOELECTRIC EFFECT, MONOCHROMATIC LIGHT, DISCHARGE TUBE.) (EXPERIMENTAL DATA, TABLES.)

AD-272 783 62-2-4 DIV. 25
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
(*OXYGEN, *IONS, ELECTRONS, CARBON DIOXIDE, CARBON COMPOUNDS, MONOXIDES, *DISSOCIATION, PROBABILITY.)

AD-272 892 62-2-4 DIV. 10
ROCKET PROPULSION ESTABLISHMENT (ST. BRIT.).
(*ROCKET OXIDIZERS, LIQUID ROCKET PROPELLANTS, *LIQUEFIED GASES, *OXYGEN, *DENSITY, PRESSURE, TEMPERATURE, LOW TEMPERATURE RESEARCH, THEORY, MATHEMATICAL ANALYSIS.) TABLES, GREAT BRITAIN.

***PARAMAGNETIC RESONANCE**

AD-272 843 62-2-4 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
(SOLID STATE PHYSICS, *MASERS IN PARAMAGNETIC CRYSTALS, *PARAMAGNETIC RESONANCE.) (*RUBY, CRYSTAL STRUCTURE, LATTICS, *RELAXATION TIME, NUCLEAR SPINS, POLARIZATION.) (QUANTUM MECHANICS, *NUCLEAR ENERGY LEVELS, ELECTROMAGNETIC FIELDS.) (TESTS AN MEASUREMENT BY INSTRUMENTATION, KLYSTRONS, OSCILLOSCOPES, PULSE GENERATORS, WAVEMETERS.)

***PARAMETRIC AMPLIFIERS**

AD-272 808 62-2-4 DIV. 25
UNIVERSITY OF SOUTHERN CALIF., ENGINEERING CENTER, LOS ANGELES.
(*PLASMA PHYSICS, *MAGNETOHYDRODYNAMICS, ELECTROMAGNETIC WAVES, SCATTERING.) (*FEASIBILITY STUDIES, *PARAMETRIC AMPLIFIERS, CESIUM, MICROWAVES, PLASMA OSCILLATIONS, CONDUCTIVITY.) (PERTURBATION THEORY, POLYNOMIALS.)

***PARTIAL DIFFERENTIAL EQUATIONS**

AD-272 610 62-2-4 DIV. 15
INSTITUTE FOR FLUID DYNAMICS AND APPLIED MATHEMATICS, U. OF MARYLAND, COLLEGE PARK.
(*PARTIAL DIFFERENTIAL EQUATIONS, *FUNCTIONAL ANALYSIS, INTEGRAL EQUATIONS, SERIES, FUNCTIONS.)

AD-272 685 62-2-4 DIV. 25
BROWN U. DIV. OF APPLIED MATHEMATICS, PROVIDENCE, R. I.
(SOLID STATE PHYSICS, STATICS AND *ELASTICITY IN *SOLIDS, SHEAR STRESSES.) (ENERGY, *POTENTIAL THEORY, TENSOR ANALYSIS *PARTIAL DIFFERENTIAL EQUATIONS, LINEAR SYSTEMS.)

***PARTICLE ACCELERATORS**

AD-272 558 62-2-4 DIV. 25
WILLIAMSON DEVELOPMENT CO., INC., *EST CONCORD, MASS.
(*PLASMA PHYSICS, FEASIBILITY STUDIES AND INSTRUMENTATION, *BETATRONS.) (ENERGY, DENSITY, EXPERIMENTAL DATA.) (VACUUM SYSTEMS, *PARTICLE ACCELERATORS, CAPACITORS.)

***PARTICLES**

AD-272 669 62-2-4 DIV. 14
TECHNICAL OPERATIONS, INC., BURLINGTON, MASS.
(*PLASTICS, POLYMERS, ESTERS, ETHYLENES, FLUORIDES, *PARTICLES, HYPERVELOCITY PROJECTILES, VELOCITY, TERMINAL BALLISTICS, PENETRATION, MATERIALS, LEAD, WAXES, ACRYLIC RESINS.) (LABORATORY EQUIPMENT, HIGH SPEED CAMERAS, HYPERVELOCITY GUNS.)

AD-272 750 62-2-4 DIV. 30
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS., ARMY CHEMICAL CENTER, MD.
(*PARTICLES, AEROSOLS, MEASUREMENT, ANALYSIS.) (AUTOMATIC COLLECTING METHODS, *DIGITAL RECORDING SYSTEMS, TEST EQUIPMENT, DESIGN.)

***PENETRATION**

AD-272 758 62-2-4 DIV. 16
LEVER BROS., CO., EDGEWATER, N. J.
(*SKIN, RATS, *ABSORPTION, *PENETRATION, AMINES, BENZENES, ORGANIC ACIDS, UREA, GLUCOSE, HISTOLOGY, CHROMATOGRAPHIC ANALYSIS.) (NUTRITION, LABORATORY ANIMALS, FATTY ACIDS, VITAMINS, LIPIDS, PROTEINS, PRIVATION.

AD-272 871 62-2-4 DIV. 20
NUCLEAR DEFENSE LAB., ARMY CHEMICAL CENTER, MD.
(*SHELTERS, CONCRETE, ROOFS, *GAMMA RAYS, *PENETRATION, MEASUREMENT, TABLES.) (RADIOACTIVE ISOTOPES, COBALT, CESIUM.) (AIR RAID SHELTERS, RADIOACTIVE FALL-OUT, GAMMA RAYS, PENETRATION.)

AD-272 947 62-2-4 DIV. 25
AMERICAN MACHINE AND FOUNDRY CO., NILES, ILL.
(*SOLID STATE PHYSICS, *TERMINAL BALLISTICS, *PENETRATION, *METAL PLATES, ARMOR PLATE, BODY ARMOR, PROJECTILES, IMPACT SHOCK, COMPRESSION SHOCK, SHOCK WAVES, ENERGY, MOTION, THEORY.) (THERMODYNAMICS, THERMAL STRESSES, IRREVERSIBLE PROCESSES, RELAXATION TIME.) MECHANICS, CONTINUUM MECHANICS, FRACTURE (MECHANICS), FATIGUE (MECHANICS), FAILURE (MECHANICS), PHYSICAL PROPERTIES, ELASTICITY, PLASTICITY, PLASTIC FLOW, STRESSES, DEFORMATION, LATTICES, EQUATIONS OF STATE, MATHEMATICAL ANALYSIS.

***PERTURBATION THEORY**

AD-272 574 62-2-4 DIV. 25
INSTITUTE FOR MOLECULAR PHYSICS, U. OF MARYLAND, COLLEGE PARK.
(*QUANTUM MECHANICS, ENERGY BY *MOLECULAR SPECTROSCOPY AND VIBRATION, *EASUREMENT.) (MATHEMATICAL ANALYSIS, *PERTURBATION THEORY, OPERATORS (MATHEMATICS).)

***PHASE SHIFTERS**

AD-272 534 62-2-4 DIV. 8
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*PHASE SHIFTERS, ULTRA HIGH FREQUENCY, FERRITES, MAGNETIC FIELDS, USSR.) (TRANSMISSION LINES, *MICROWAVE EQUIPMENT, *FERRITE CORES, *COAXIAL CABLES, HELIXES, DIELECTRICS, ATTENUATION, RADIO SIGNALS, RADIO TRANSMITTERS, RADIO RECEIVERS, MEASUREMENT.)

***PHASE STUDIES**

AD-272 561 62-2-4 DIV. 17
COLUMBIA U., NEW YORK.
(*COPPER ALLOYS, *GOLD ALLOYS, *PHASE STUDIES, PHASE TRANSITIONS, COPPER COMPOUNDS, GOLD COMPOUNDS, *MOLECULAR ASSOCIATION, *RESISTANCE, ELECTRICAL PROPERTIES, THERMOELECTRICITY, MECHANICAL PROPERTIES, ELASTICITY, HIGH TEMPERATURE RESEARCH, THEORY.)

AD-272 804 62-2-4 DIV. 25
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
(*FERROMAGNETIC MATERIALS, SYNTHESIS, *METALLIC CRYSTALS, *CRYSTAL STRUCTURE, MAGNETIC PROPERTIES, *PHASE STUDIES, CYLINDRICAL BODIES, MAGNETIC MOMENTS, X-RAY DIFFRACTION ANALYSIS, MICROWAVE SPECTROSCOPY, MEASUREMENT.) (NICKEL COMPOUNDS, COPPER COMPOUNDS, ZINC COMPOUNDS, BARIUM COMPOUNDS LEAD COMPOUNDS, IRON COMPOUNDS, OXIDES, ELECTRIC POTENTIAL.) (*CHROMIUM COMPOUNDS AND *ZIRCONIUM COMPOUNDS, *OXIDES.) (CHROMIUM ALLOYS, NICKEL ALLOYS.) (THEORY, *PHASE STUDIES, X-RAY DIFFRACTION ANALYSIS, METALLURGICAL ANALYSIS.)

AD-272 835 62-2-4 DIV. 25
CINCINNATI U., OHIO.
(*CERAMIC MATERIALS, *REFRACTORY MATERIALS, *THERMODYNAMICS, HIGH TEMPERATUR RESEARCH, CRYSTALS, LATTICES.) (ELECTROLYTC CELLS, IRON COMPOUNDS, OXIDES, ELECTRIC POTENTIAL.) (*CHROMIUM COMPOUNDS AND *ZIRCONIUM COMPOUNDS, *OXIDES.) (CHROMIUM ALLOYS, NICKEL ALLOYS.) (THEORY, *PHASE STUDIES, X-RAY DIFFRACTION ANALYSIS, METALLURGICAL ANALYSIS.)

***PHOSPHATES**

AD-272 684 62-2-4 DIV. 16
DENTAL RESEARCH FACILITY, NAVAL TRAINING CENTER, GREAT LAKES, ILL.
(DENTAL RESEARCH, *DENTAL MATERIALS, *ZINC COMPOUNDS, *OXIDES, *PHOSPHATES, *SILVER ALLOYS, *SILICATES.)

***PHOSPHORS**

AD-272 786 62-2-4 DIV. 25
WESTINGHOUSE ELECTRIC CORP., BLOOMFIELD, N. J.
(LUMINESCENCE, *LUMINESCENT MATERIALS, LUMINESCENT PIGMENTS, *PHOSPHORS, *CRYSTAL PHOSPHORS, COLORS.) (*COMPLEX COMPOUNDS, *ZINC COMPOUNDS, *SULFIDES AND COPPER COMPOUNDS, THALLIUM COMPOUNDS, LITHIUM COMPOUNDS, IRON COMPOUNDS, IODIDES, CADMIUM COMPOUNDS, ALUMINUM COMPOUNDS, MERCURY COMPOUNDS, OXYGEN COMPOUNDS.) (PHOTOEMISSION, EXCITATION.) (DIELECTRICS, PLASTICS, IMPREGNATION, PHOSPHORS.)

AD-272 929 62-2-4 DIV. 25
SERVOMECHANISMS, INC., GOLETA, CALIF.
(*THIN FILMS, *DIELECTRIC FILS, MAGNETIC MATERIALS, *LUMINESCENT MATERIALS, LUMINOUS PIGMENTS, *PHOSPHORS, MATERIALS, METALLIC SMOKE DEPOSITS, ZINC COMPOUNDS, SULFIDES, CATALYSTS, POWDER METALS, MANGANESE, SURFACES, GLASS, PHOTOEMISSION, EXCITATION, ELECTRICITY,) MANUFACTURING METHODS, VACUUM APPARATUS.

***PHOSPHORUS ALLOYS**

AD-272 635 62-2-4 DIV. 25
STRASBOURG U. (FRANCE).
(*IRON COMPOUNDS, *COBALT COMPOUNDS, BORIDES, *PHOSPHIDES, SYNTHESIS.) (ALLOYS, *BORON ALLOYS, TRANSITION ELEMENTS, IRON ALLOYS, COBALT ALLOYS, NICKEL ALLOYS, MANGANESE ALLOYS, *PHOSPHORUS ALLOYS.) (FERROMAGNETISM, *FERROMAGNETIC MATERIALS, FERROELECTRIC CRYSTALS, PARAMAGNETIC CRYSTALS, MAGNETIC PROPERTIES, ANTIFERROMAGNETISM, THERMODYNAMICS.) FRANCE.

***PHOTOELASTIC MATERIALS**

AD-272 888 62-2-4 DIV. 17
CHANCE VOUGHT CORP., DALLAS, TEX.
(*ALUMINUM ALLOYS, FATIGUE (MECHANICS), STRESSES, CORROSION,) (NIOBIUM ALLOYS, DIFFUSION OF *CERAMIC COATINGS AS OXIDATION INHIBITORS,) (MAGNESIUM ALLOYS, CASTINGS, MECHANICAL PROPERTIES.) (HYDRAULIC SYSTEMS, METAL SEALS, *ALLOYS,) (NICKEL ALLOYS, SHEETS, *HEAT RESISTANT ALLOYS,) (*BLACKBODY RADIATION, ZIRCONIUM COMPOUNDS, OXIDES,) (*PHOTOELASTIC MATERIALS, COATINGS,) (*GLASS TEXTILES, AIRCRAFT CANOPIES.)

***PHOTOEMISSION**

AD-272 773 62-2-4 DIV. 8
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
(*SEMICONDUCTORS, *THERMIONIC EMISSION, *PHOTOEMISSION, FIELD EMISSION, SURFACE PROPERTIES, CONDUCTIVITY, CRYSTAL STRUCTURE, LUMINESCENCE, MEASUREMENT,) (CRYSTALS, SILICON, CESIUM, TUNGSTEN, ARGON, DIFFUSION, SURFACES, THICKNESS, PROCESSING, PREPARATION,)

***PHOTOGRAPHIC ANALYSIS**

AD-272 585 62-2-4 DIV. 24
SYRACUSE U. RESEARCH INST., N. Y.
(*AERIAL PHOTOGRAPHS, *PHOTOGRAPHIC ANALYSIS OF ERRORS IN MEASUREMENT FOM DISTORTION OF *PHOTOGNAPHIC FILM AND REFRACTIVE PROPERTIES OF ATMOSPHERE, UPPER ATMOSPHERE, *ATMOSPHERIC REFRACTION, MATHEMATICA ANALYSIS, TESTS, MATHEMATICAL PREDICTION, TABLES, ATMOSPHERE MODELS,)

AD-272 632 62-2-4 DIV. 24
HOWELL, W. E., ASSOCIATES, INC., LEXINGTON, MASS.
(*METEOROLOGY, *PHOTOGRAPHIC ANALYSIS OF *CLOUDS USING AERIAL CAMERAS, SURFACE TO AIR, CAMERA MOUNTS, STEREOSCOPES, MAPPING, EFFECTIVENESS, ERRORS FOR WIND, ATMOSPHERE, MOTION, SHEAR STRESSES, TESTS,)

***PHOTOGRAPHIC FILM**

AD-272 585 62-2-4 DIV. 24
SYRACUSE U. RESEARCH INST., N. Y.
(*AERIAL PHOTOGRAPHS, *PHOTOGRAPHIC ANALYSIS OF ERRORS IN MEASUREMENT FOM DISTORTION OF *PHOTOGNAPHIC FILM AND REFRACTIVE PROPERTIES OF ATMOSPHERE, UPPER ATMOSPHERE, *ATMOSPHERIC REFRACTION, MATHEMATICA ANALYSIS, TESTS, MATHEMATICAL PREDICTION, TABLES, ATMOSPHERE MODELS,)

***PHOTONS**

AD-272 604 62-2-4 DIV. 25
CORNELL U., ITHACA, N. Y.
(*PHOTONS, ABSORPTION, *HELIUM, *LITHIUM,) (ATOMS, ENERGY, ABSORPTION, *ELECTRON TRANSITION,) (INSTRUMENTATION, *X-RAY ABSORPTION ANALYSIS, PHOTOMULTIPLIERS,)

***PHYSICAL PROPERTIES**

AD-272 545 62-2-4 DIV. 25
ARNOLD ENGINEERING DEVELOPMENT CENTER, ARNOLD AIR FORCE STATION, TENN.
(HANDBOOKS OF *PHYSICAL PROPERTIES, MEASUREMENT,) *TABLES, *BIBLIOGRAPHY

***PLANETARY ATMOSPHERES**

AD-272 831 62-2-4 DIV. 2
ELECTRO-MECHANICS CO., AUSTIN, TEX.
(*MAGNETIC FIELDS, *PLANETARY ATMOSPHERES, INTERSTELLAR MATTER, *SPACE PROBES, SOLAR ATMOSPHERE, SOLAR CORONA, *TERRESTRIAL MAGNETISM, SOLAR NOISE,) (*MAGNETOHYDRODYNAMICS, SHOCK WAVES, PLASMA PHYSICS,) (INSTRUMENTATION, TESTS, RELIABILITY, MAGNETOMETERS, TELEMETER SYSTEMS, COMMUNICATIONS THEORY,) *BIBLIOGRAPHY,

***PLASMA OSCILLATIONS**

AD-272 556 62-2-4 DIV. 25
WILLIAMSON DEVELOPMENT CO., INC., WEST CONCORD, MASS.
(*PLASMA OSCILLATIONS, GAS IONIZATION, *GAS DISCHARGES, HELIUM, HYDROGEN,) (BETATRONS, PARTICLES, ORBITAL FLIGHT PATHS, ELECTRONS, *ELECTRON BEAMS, *SECONDARY EMISSION,) *LOW PRESSURE RESEARCH,

***PLASMA PHYSICS**

AD-272 557 62-2-4 DIV. 25
WILLIAMSON DEVELOPMENT CO., INC., WEST CONCORD, MASS.
(*PLASMA PHYSICS, *BETATRONS, ELECTRON BEAMS, PARTICLE ACCELERATORS, GAS FLOW, GAS IONIZATION, MAGNETIC FIELDS,) (INSTRUMENTATION, DESIGN, OSCILLOSCOPES, COILS, TRANSFORMERS, TRIODES,)

AD-272 558 62-2-4 DIV. 25
WILLIAMSON DEVELOPMENT CO., INC., WEST CONCORD, MASS.
(*PLASMA PHYSICS, FEASIBILITY STUDIES AND INSTRUMENTATION, *BETATRONS,) (ENERGY, DENSITY, EXPERIMENTAL DATA,) (VACUUM SYSTEMS, *PARTICLE ACCELERATORS, CAPACITORS,)

AD-272 808 62-2-4 DIV. 25
UNIVERSITY OF SOUTHERN CALIF., ENGINEERING CENTER, LOS ANGELES.
(*PLASMA PHYSICS, *MAGNETOHYDRODYNAMICS, ELECTROMAGNETIC WAVES, SCATTERING,) (*FEASIBILITY STUDIES, *PARAMETRIC AMPLIFIERS, CESIUM, MICROWAVES, PLASMA OSCILLATIONS, CONDUCTIVITY,) (PERTURBATION THEORY, POLYNOMIALS,)

AD-272 814 62-2-4 DIV. 25
ADVANCED KINETICS, INC., COSTA MESA, CALIF.
(*PLASMA PHYSICS, *HIGH TEMPERATURE RESEARCH, STABILITY,) (GAS IONIZATION AND *TRANSPORT PROPERTIES OF HYDROGEN UNDER *MAGNETIC PINCH,) (ELECTROMAGNETIC WAVES, THERMAL RADIATION, MAGNETIC FIELDS, DIPOLE MOMENTS,) (INSTRUMENTATION, VACUUM SYSTEMS, PHOTOMULTIPLIERS, HIGH SPEED PHOTOGRAPHY,)

AD-272 841 62-2-4 DIV. 25
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*BIBLIOGRAPHY AND ABSTRACTIN OF *PLASMA PHYSICS, *ELECTROMAGNETIC WAVES, *WAVE TRANSMISSION, MICROWAVES,) (THEORY, EXPERIMENTAL DATA AND FEASIBILITY STUDIES,)

AD-272 849 62-2-4 DIV. 8
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
(*THERMOELECTRICITY, ELECTRIC POWER PRODUCTION, POWER SUPPLIES,) (ELECTRICAL PROPERTIES, MOLYBDENUM, CESIUM, *DIODES,) (*THERMIONIC EMISSION, *PLASMA PHYSICS, CESIUM, DISCHARGE TUBES,) (THERMIONIC EMISSION, MOLYBDENUM, CATHODES (ELECTRON TUBES), EVAPORATION IN CESIUM, VAPORS,) (ELECTRONS, REFLECTION FROM CESIUM, COATINGS, THIN FILMS,) (CESIUM, VAPORS, THERMAL CONDUCTIVITY,)

AD-272 872 62-2-4 DIV. 25
MICROWAVE LAB., STANFORD U., CALIF.
(*FEASIBILITY STUDIES AND ABSTRACTING OF SCIENTIFIC RESEARCH ON *MICROWAVE EQUIPMENT AND *PLASMA PHYSICS,) RESEARCH PROGRAM ADMINISTRATION,

***PLASTIC FLOW**

AD-272 550 62-2-4 DIV. 25
ILLINOIS INST. OF TECH., CHICAGO.
(*LOAD DISTRIBUTION, LOADING *STRUCTURAL SHELLS, PLASTICS, STRESSES, *PLASTIC FLOW,) (STRESSES, MATHEMATICAL ANALYSIS,)

***PLASTICITY**

AD-272 648 62-2-4 DIV. 25
BROWN U. DIV. OF APPLIED MATHEMATICS, PROVIDENCE, R. I.
(*CANTILEVER BEAMS, LOADING, LOAD DISTRIBUTION, *DEFORMATION, *PLASTICITY,) (STRESSES, MATHEMATICAL ANALYSIS,)

***PLASTICS**

AD-272 555 62-2-4 DIV. 26
WESTINGHOUSE ELECTRIC CO., EAST PITTSBURGH, PA.
(*LUBRICATION *GEARS, *BALL BEARINGS, LOW PRESSURE RESEARCH, MATERIALS, FRICTION, EVAPORATION,) (LUBRICANTS, *POWDERS, SOLIDS, POROUS MATERIALS, *PLASTICS, BEARINGS, *ALLOYS, CERMETS, POWDER METALS, SINTERED ALLOYS,) (TEST EQUIPMENT, VACUUM APPARATUS,)

AD-272 592 62-2-4 DIV. 14
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS., ARMY CHEMICAL CENTER, MD.
(*MATERIALS, *ORGANIC MATERIAS, *CERAMIC MATERIALS, INORGANIC SUBSTANCES, *FIBERS, PRODUCTION, SYNTHESIS, MANUFACTURING METHODS,) (METALORGANIC COMPOUNDS, *POLYMER, *PLASTICS, HEAT RESISTANT POLYMERS, RESINS, LAMINATES, COATINGS, ADHESIVES,) (*SYNTHETIC FIBERS, TEXTILES,) (METALS, ALLOYS,)

AD-272 669 62-2-4 DIV. 14
TECHNICAL OPERATIONS, INC., BURLINGTON, MASS.
(*PLASTICS, POLYMERS, ESTERS, ETHYLENES, FLUORIDES, *PARTICLES, HYPERVELOCITY PROJECTILES, VELOCITY, TERMINAL BALLISTICS, PENETRATION, MATERIALS, LEAD, WAXES, ACRYLIC RESINS,) (LABORATORY EQUIPMENT, HIGH SPEED CAMERAS, HYPERVELOCITY GUNS,)

AD-272 886 62-2-4 DIV. 27
BENDIX SYSTEMS DIV., BENDIX CORP., SOUTH BEND IND.
(STRUCTURES, *ROCKET CASES, PRESSURE VESSELS, FILAMENT WOUND CONSTRUCTIN, *GLASS TEXTILES, REINFORCING MATERIALS, *PLASTICS, RESINS, LAMINATES,) (TESTS, TEST EQUIPMENT, TEST METHODS, STRESSES, DEFORMATION,)

***POLYMERIZATION**

AD-272 594 62-2-4 DIV. 4
MONOMER-POLYMER, BORDEN CO., PHILADEPHIA, PA.
(*POLYMERS, *POLYMERIZATION, *STYRENES, *ETHYLENES, STEREOCHEMISTRY,) (SYNTHESIS, STYRENES, FLUORIDES, FLUORINATION, NITRATION, HALOGENATION, SOLUBILITY,) (MOLCULAR STRUCTURE, CHEMICAL REACTIONS, CHEMICA WARFARE AGENTS, G AGENTS,) (CATALYSIS, CATALYSTS, METALORGANIC COMPOUNDS,)

***POLYMERS**

AD-272 592 62-2-4 DIV. 14
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS., ARMY CHEMICAL CENTER, MD.
(*MATERIALS, *ORGANIC MATERIAS, *CERAMIC MATERIALS, INORGANIC SUBSTANCES, *FIBERS, PRODUCTION, SYNTHESIS, MANUFACTURING METHODS,) (METALORGANIC COMPOUNDS, *POLYMER, *PLASTICS, HEAT RESISTANT POLYMERS, RESINS, LAMINATES, COATINGS, ADHESIVES,) (*SYNTHETIC FIBERS, TEXTILES,) (METALS, ALLOYS,) (TOXICITY, HAZARDS,) (RADIATION EFFECTS, SPACE ENVIRONMENTAL CONDITIONS, GUIDED MISSILES,) SOLID ROCKET PROPELLANTS, *BIBLIOGRAPHY,

AD-272 594 62-2-4 DIV. 4
MONOMER-POLYMER, BORDEN CO., PHILADEPHIA, PA.
(*POLYMERS, *POLYMERIZATION, *STYRENES, *ETHYLENES, STEREOCHEMISTRY,) (SYNTHESIS, STYRENES, FLUORIDES, FLUORINATION, NITRATION, HALOGENATION, SOLUBILITY,) (MOLCULAR STRUCTURE, CHEMICAL REACTIONS, CHEMICA WARFARE AGENTS, G AGENTS,) (CATALYSIS, CATALYSTS, METALORGANIC COMPOUNDS,)

***POTASSIUM**

AD-272 809 62-2-4 DIV. 20
UNITED NUCLEAR CORP., WHITE PLAINS, N. Y.
(*NEUTRON CROSS SECTIONS, *TITANIUM, *POTASSIUM, *MAGNESIUM, *NITROGEN, ALUMINUM, SILICON, SODIUM, OXYGEN,) (NEUTRONS SCATTERING, GAMMA RAYS,) TABLES,

***POTENTIAL THEORY**

AD-272 685 62-2-4 DIV. 25
BROWN U. DIV. OF APPLIED MATHEMATICS, PROVIDENCE, R. I.
(SOLID STATE PHYSICS, STATICS AND *ELASTICITY IN *SOLIDS, SHEAR STRESSES,) (ENERGY, *POTENTIAL THEORY, TENSOR ANALYSIS *PARTIAL DIFFERENTIAL EQUATIONS, LINEAR SYSTEMS,)

AD-272 698 62-2-4 DIV. 19
CALIFORNIA U., BERKELEY.
(*FUNCTIONS AND *POTENTIAL THEORY OF *ELASTICITY AND STRESSES,) (*HARMONIC ANALYSIS, CONFORMAL MAPPING, PARTIAL DIFFERENTIAL EQUATIONS, TAYLOR'S SERIES, POLYNOMIALS, TRANSFORMATIONS (MATHEMATICS),)

***POWDER ALLOYS**

AD-272 993 62-2-4 DIV. 17
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(ALLOYS, METALS, *POWDER ALLOYS, POWDER METALS, *MOLYBDENUM ALLOYS, TITANIUM ALLOYS, CARBON ALLOYS, PROCESSING,) (PREPARATION BY MAGNESIUM REDUCTION AND EXTRUSION FROM MIXTURES, MOLYBDENUM COMPOUNDS, TITANIUM COMPOUNDS, CARBON COMPOUNDS, CHLORIDES,) (LABORATORY EQUIPMENT, DESIGN, OPERATION,)

***POWDER METALLURGY**

AD-272 778 62-2-4 DIV. 17
SYLVANIA ELECTRIC PRODUCTS, INC., TOWANDA, PA.
(PRODUCTION, *MOLYBDENUM, *MOLYBDENUM ALLOYS, TITANIUM ALLOYS, CARBON ALLOYS, SHEETS, *POWDER METALLURGY,) (CONTROLLED ATMOSPHERES, *SINTERING, HYDROGEN,

DISSOCIATION• AMMONIA• TEMPERATURE• VACUUM FURNACES• TENSILE PROPERTIES.) (ADDITIVES• NITROGEN• OXYGEN• CARBON• TITANIUM COMPOUNDS• CARBIDES• OXIDES• NITRIDES.) ALLOYS• HEAT RESISTANT ALLOYS• PROCESSING• POWDER ALLOYS• POWDER METALS• HARDENING.

•POWDERS

AD-272 555 62-2-4 DIV. 26
WESTINGHOUSE ELECTRIC CO.• EAST PITTSBURGH• PA.
(•LUBRICATION •GEARS• •BALL BEARINGS• LOW PRESSURE RESEARCH• MATERIALS• FRICTION• EVAPORATION.) (LUBRICANTS• •POWDERS• SOLIDS• POROUS MATERIALS• •PLASTICS• BEARINGS• •ALLOYS• CERMETS• POWDER MLTALS• SINTERED ALLOYS.) (TEST EQUIPMENT• VACUUM APPARATUS.)

•POWER AMPLIFIERS

AD-272 627 62-2-4 DIV. 8
WATKINS JOHNSON CO.• PALO ALTO• CALIF.
(•KLYSTRONS• S BAND• ELECTRON TUBES• •MICROWAVE AMPLIFIERS• •POWER AMPLIFIERS• FEASIBILITY STUDIES.) (ELECTRODES• •ELECTRON GUNS• OPTICS• FOCUSING• SOLENOIDS MAGNETIC FIELDS• ELECTRON BEAMS• CATHODES (ELECTRON TUBES)• ANODES (ELECTRON TUBES)• HEATING• MODULATION• DESIGN• TESTS• TEST EQUIPMENT.)

•POWER SUPPLIES

AD-272 752 62-2-4 DIV. 7
GENERAL ATOMIC DIV.• GENERAL DYNAMICS CORP.• SAN DIEGO• CALIF.
(•POWER SUPPLIES FROM •THERMIONIC EMISSION• •CESIUM• VAPORS.) (CATHODES• URANIUM COMPOUNDS• ZIRCONIUM COMPOUNDS• CARBIDES• ANODES• COPPER.) (TEMPERATURE• •MEASUREMENT• IONS• ELECTRICITY• PRODUCTION.) THEORY• DESIGN• DIODES• THERMOELECTRICITY.

AD-272 753 62-2-4 DIV. 7
GENERAL ATOMIC DIV.• GENERAL DYNAMICS CORP.• SAN DIEGO• CALIF.
(•ELECTRIC POWER PRODUCTION• •POWER SUPPLIES• THERMIONIC EMISSION• DESIG• MANUFACTURING METHODS.) (•THERMIONIC EMISSION WITH URANIUM COMPOUNDS AND CARBIDES• ZIRCONIUM COMPOUNDS.) (POWER SUPPLIES FOR POWER REACTORS FOR SPACE FLIGHT.) VACUUM SYSTEMS.

•PRECIPITATION

AD-272 566 62-2-4 DIV. 2
DEUTSCHER WETTERDIENST• HOHENPEISSENBERG (GERMANY).
(•RAINDROPS• INTENSITY• RECORDING DEVICES• GERMANY.) (•PRECIPITATION• CLIMATIC FACTORS• ATMOSPHERE• COLLECTING METHODS.)

•PRESSURE

AD-272 596 62-2-4 DIV. 22
BROADVIEW RESEARCH CORP.• BURLINGAME• CALIF.
(ROX• •EXPLOSIONS• •BLAST• •SHOCK WAVES• •PRESSURE• MEASUREMENT• PRESSURE GAGES• TERRAIN• CONFIGURATION• TERRAIN MODELS• MODEL TESTS• TEST EQUIPMENT.) (•NUCLEAR EXPLOSIONS• SIMULATION.)

•PRIMARY BATTERIES

AD-272 666 62-2-4 DIV. 7
RADIO CORP. OF AMERICA• SOMERVILLE• N. J.
(•PRIMARY BATTERIES• •KEY CELL• •MAGNESIUM ALLOYS• •NITRO RADICALS• •ORGANIC COMPOUNDS• THEORY• ELECTROCHEMISTRY.) (CATHODES (ELECTROLYTIC CELL)• CARBON• BENZENES• NITRO RADICALS• HETEROCYCLIC COMPOUNDS• PYRIDINES• PYRIMIDINES• FURAN• THIOPHENES.) (ELECTROLYTES• MAGNESIUM COMPOUNDS• PERCHLORATES• BROMIDES.) (ANODES (ELECTROLYTIC CELL)• MAGNESIUM ALLOYS.)

•PRINTED CIRCUITS

AD-272 609 62-2-4 DIV. 14
LITTON INDUSTRIES• VAN NUYS• CALIF.
(•PRINTED CIRCUITS• MATERIALS SURFACE PROPERTIES• ELECTRICAL PROPERTIES• MECHANICAL PROPERTIES.) (TESTS• ELECTRIC INSULATION• RESISTANCE• TEMPERATURE• ADHESION• DETERIORATION• DIELECTRIC PROPERTIES• WATER• ABSORPTION.) (•LAMINATES• PAPER AND P-HENOLIC RESINS OR EPOXY RESINS• SILICONE RESINS OR ETHYLENES AND FLUORIDES AND POLYMERS• RESINS AND GLASS TEXTILES.) (•FOILS• COPPER.) CONDUCTORS• TEST METHODS• TEST EQUIPMENT• DESIGN.

•PRODUCTION

AD-272 878 62-2-4 DIV. 8
PACIFIC SEMICONDUCTORS• INC.• LAWNDALE• CALIF.
(•PRODUCTION• ENGINEERING• ANALYSIS FOR PRODUCTION OF VERY HIGH FREQUECY• SILICON• •TRANSISTORS.) •MANUFACTURING METHODS• TEST &QUIPMENT FOR PRODUCTION OF TRANSISTORS.

AD-272 995 62-2-4 DIV. 8
ITT FEDERAL LABS.• FORT WAYNE• IND.
(•PRODUCTION• ENGINEERING• ANALYSIS FOR PRODUCTION OF •STORAGE TUBES.

•PROGRAMMING

AD-272 570 62-2-4 DIV. 30
LAND-AIR• INC.• POINT MUGU• CALIF.
(•DIGITAL COMPUTERS• •PROGRAMMING.) EXPERIMENTAL DATA.

AD-272 571 62-2-4 DIV. 30
LAND-AIR• INC.• POINT MUGU• CALIF.
(•DIGITAL COMPUTERS• •PROGRAMMING.)

AD-272 599 62-2-4 DIV. 30
BOEING SCIENTIFIC RESEARCH LABS.• SEATTLE• WASH.
(COMPUTERS• •COMPUTER LOGIC• DATA PROCESSING SYSTEMS.) (MATHEMATICAL COMPUTER DATA• •PROGRAMMING.)

AD-272 798 62-2-4 DIV. 30
LAND-AIR• INC.• POINT MUGU• CALIF.
(•DIGITAL COMPUTERS• •PROGRAMMING• CODING• HANDBOOKS.)

AD-272 859 62-2-4 DIV. 30
AIR FORCE SPECIAL WEAPONS CENTER• KIRTLAND AIR FORCE BASE• N. MEX.
(•PROGRAMMING• •COMPUTERS• •SPACE PROBES• BOOSTER ROCKETS• •ORBITAL FLIGHT PATHS• VELOCITY.) (•GEODESICS• •CELESTIAL MECHANICS• TIME• AZIMUTH• CELESTIAL NAVIGATION• PERTURBATION THEORY• GRAVITY.)

•PROJECTILE FUZES

AD-272 989 62-2-4 DIV. 22
FELTMAN RESEARCH LABS.• PICATINNY ARSENAL• DOVER• N. J.
(•NON-DESTRUCTIVE TESTING• •RADIOACTIVE ISOTOPES• GAMMA RAYS• DETECTION• NEUTRON DETECTORS FOR QUALITY CONTROL• •FIRE• •SPRINGS• •PROJECTILE FUZES• •FUZES.)

•PROPAGATION

AD-272 549 62-2-4 DIV. 20
AIR FORCE SPECIAL WEAPONS CENTER• KIRTLAND AIR FORCE BASE• N. MEX.
(NUCLEAR EXPLOSIONS• NEUTRON SCATTERING• HIGH ALTITUDE• •NEUTRONS• NEUTRON FLUX DENSITY• DENSITY• MEASUREMENT.) (NUCLEAR EXPLOSIONS• NEUTRONS• •PROPAGATION THROUGH ATMOSPHERE.)

•PROTEINS

AD-272 529 62-2-4 DIV. 16
BIRMINGHAM U. (GT. BRIT.).
(•PROTEINS• •LABELED SUBSTANCES• DIET• METABOLISM.) (•SPRUE• BIOCHEMISTRY• ABSORPTION• METABOLIC PRODUCTS• DEFICIENCY DISEASES.)

•PROTONS

AD-272 790 62-2-4 DIV. 25
ENRICO FERMI INST. FOR NUCLEAR STUDIES• U. OF CHICAGO• ILL.
(BALLOONS• SOLAR OBSERVATORIES.) (•COSMIC RAYS• •PROTONS• •SOLAR DISTURBANCE.)

•PSYCHOLOGY

AD-272 568 62-2-4 DIV. 28
INDIANA U.• BLOOMINGTON.
(•PSYCHOLOGY• •LEARNING• TRANSFER OF TRAINING• REASONING• CONDITIONED REFLEX• THEORY• MATHEMATICAL ANALYSIS• PROBABILITY.)

•PYROTECHNICS

AD-272 580 62-2-4 DIV. 3
NAVAL RESEARCH LAB.• WASHINGTON• D. C.
(•PYROTECHNICS• •SODIUM COMPOUNDS• •CHLORATES• FIBERS• METALLIC TEXTILS• GLASS TEXTILES• BINDERS• POWDER METALS• IRON• BARIUM COMPOUNDS• DIOXIDES• MANUFACTURING METHODS• HIGH PRESSURE RESEARCH• DENSITY• MOLDING.) (OXYGEN• PRODUCTION• SUBMARINES.) (DECOMPOSITION• CHEMICAL REACTIONS• COMBUSTION.)

•QUANTUM MECHANICS

AD-272 574 62-2-4 DIV. 25
INSTITUTE FOR MOLECULAR PHYSICS• U. OF MARYLAND• COLLEGE PARK.
(•QUANTUM MECHANICS• ENERGY BY •MOLECULAR SPECTROSCOPY AND VIBRATION• •EASUREMENT.) (MATHEMATICAL ANALYSIS• •PERTURBATION THEORY• OPERATORS (MATHEMATICS).)

AD-272 773 62-2-4 DIV. 25
PHYSICS• ENGINEERING• CHEMISTRY CORP.• BOULDER• COLO.
(•QUANTUM MECHANICS• •GASES• •TRANSPORT PROPERTIES• VISCOSITY• SHEAR STRESSES.) TENSOR ANALYSIS.

***RADAR**

AD-272 883 62-2-4 DIV. 6
UNITED RESEARCH, INC., CAMBRIDGE, MASS.
(ATMOSPHERE, HIGH ALTITUDE, TURBULENCE, MEASUREMENT.) (*INTERFEROMETER, *RADAR,) (RADAR TRANSMITTERS, RADAR RECEIVERS, MICROWAVES, RADAR ANTENNAS, RADAR REFLECTORS,)

***RADAR BEACONS**

AD-272 777 62-2-4 DIV. 8
SPERRY GYROSCOPE CO., GREAT NECK, N. Y.
(*SLOT ANTENNAS, *LENS ANTENNAS, *AIRPLANE ANTENNAS, *RADAR BEACONS, AIRBORNE, X BAND, IDENTIFICATION SYSTEMS, COMMERCIAL PLANES, AVIATION SAFETY, INSTALLATION, EFFECTIVENESS, ANTENNA RADIATION PATTERNS, FLIGHT TESTING,)

***RADIO SIGNALS**

AD-272 628 62-2-4 DIV. 25
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON,
(*DOPPLER SYSTEMS, MEASUREMENT OF *WAKE, IONIZATION BY ALUMINUM OR NYLON, *HYPERVELOCITY PROJECTILES FROM HYPERVELOCITY GUNS INTO STORAGE TANKS,) (ELECTRONIC EQUIPMENT, INSTRUMENTATION, *RADIOFREQUENCY SPECTRUM ANALYZERS, WAVEGUIDES, *RADIO SIGNALS, OSCILLOSCOPES, PHASE SHIFTERS,) (ELECTROMAGNETIC WAVES, WAVE TRANSMISSION, THERMAL RADIATION,)

***RADIO STATIONS**

AD-272 979 62-2-4 DIV. 6
BATTELLE INSTITUTE, FRANKFURT/MAIN (GERMANY),
(*SATELLITE VEHICLES, NAVIGATION, *DOPPLER TRACKING, *DOPPLER NAVIGATION, TRACKING, *RADIO STATIONS, RADIO RECEIVERS, VERY HIGH FREQUENCY, DIPOLE ANTENNAS, MAGNETIC RECORDING SYSTEMS, RADIO EQUIPMENT, INSTRUMENTATION, INSTALLATION,) GERMANY.

***RADIO TRANSMISSION**

AD-272 663 62-2-4 DIV. 8
IONOSPHERE RESEARCH LAB., PENNSYLVANIA STATE U., UNIVERSITY PARK,
(ANALYSIS, *IONOSPHERE, MAGNETO-OPTIC ROTATION, *RADIO TRANSMISSION, *SATELLITE VEHICLES,) (MEASUREMENT, MAGNETO-OPTIC ROTATION, RADIO SIGNALS, SATELLITE VEHICLES) (MEASUREMENT, DENSITY, ELECTRONS, IONOSPHERE,)

***RADIOACTIVE ISOTOPES**

AD-272 989 62-2-4 DIV. 22
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(*NON-DESTRUCTIVE TESTING, *RADIOACTIVE ISOTOPES, GAMMA RAYS, DETECTION, NEUTRON DETECTORS FOR QUALITY CONTROL, *WIRE, *SPRINGS, *PROJECTILE FUZES, *FUZES,)

***RADIOFREQUENCY ATTENUATORS**

AD-272 791 62-2-4 DIV. 8
LABORATORIES FOR RESEARCH AND DEVELOPMENT, FRANKLIN INST., PHILADELPHIA, PA.
(*ELECTRIC DETONATORS, *ELECTRIC IGNITERS, *RADIOFREQUENCY ATTENUATORS, RADIOFREQUENCY, ELECTROMAGNETIC WAVES, HAZARDS, BROADBAND, ABSORPTION, ATTENUATION, MEASUREMENT, MATERIALS, DESIGN,) FERRITES, IRON COMPOUNDS, CARBONYL RADICALS, POWDERS, DIELECTRICS, RADIOFREQUENCY FILTERS, PHOSPHORS, LUMINESCENT MATERIALS, PHOTOSENSITIVITY, RESISTORS,

***RADIOFREQUENCY FILTERS**

AD-272 757 62-2-4 DIV. 8
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON,
(DETERIORATION IN SIGNAL-TO-NOISE RATIO OF *RADIOFREQUENCY FILTERS, *DETECTORS,) (ERRORS IN RADIOFREQUENCY FILTERS, DETECTORS,)

***RADIOFREQUENCY SPECTRUM ANALYZERS**

AD-272 629 62-2-4 DIV. 25
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON,
(*DOPPLER SYSTEMS, MEASUREMENT OF *WAKE, IONIZATION BY ALUMINUM OR NYLON, *HYPERVELOCITY PROJECTILES FROM HYPERVELOCITY GUNS INTO STORAGE TANKS,) (ELECTRONIC EQUIPMENT, INSTRUMENTATION, *RADIOFREQUENCY SPECTRUM ANALYZERS, WAVEGUIDES, *RADIO SIGNALS, OSCILLOSCOPES, PHASE SHIFTERS,) (ELECTROMAGNETIC WAVES, WAVE TRANSMISSION, THERMAL RADIATION,)

***RADIOPROTECTIVE DRUGS**

AD-272 661 62-2-4 DIV. 16
NORTH TEXAS STATE U., DENTON,
(*RADIOPROTECTIVE DRUGS, *AMINES, ETHYL RADICALS, ANILINES,) SYNTHESIS,

***RAINDROPS**

AD-272 566 62-2-4 DIV. 2
DEUTSCHER WETTERDIENST, HOHENPEISSENBERG (GERMANY),
(*RAINDROPS, INTENSITY, RECORDING DEVICES, GERMANY,) (*PRECIPITATION, CLIMATIC FACTORS, ATMOSPHERE, COLLECTING METHODS,)

***RARE GASES**

AD-272 582 62-2-4 DIV. 25
OBSERVATOIRE DE PARIS-MEUDON (FRANCE),
(*GLOW DISCHARGES OF NITROGEN, HELIUM, *RARE GASES,) (ELECTRONS, DISSOCIATION, ELECTRON TRANSITIONS, *TRANSPORT PROPERTIES *RECOMBINATION REACTIONS,) (INSTRUMENTATION AND MEASUREMENT OF ELECTRICAL CONDUCTANCE,)

***READING**

AD-272 687 62-2-4 DIV. 23
NAVAL PERSONNEL RESEARCH FIELD ACTIVITY, SAN DIEGO, CALIF.
(*BIBLIOGRAPHY, *READING, EDUCATION, TRAINING,)

***REASONING**

AD-272 894 62-2-4 DIV. 28
RAND CORP., SANTA MONICA, CALIF.
(SIMULATION OF *REASONING BY *COMPUTERS,) *BEHAVIOR, PROBABILITY, MEMORY, LEARNING, MATHEMATICAL ANALYSIS, MATHEMATICL LOGIC, CYBERNETICS, INFORMATION THEORY, *COMPUTER LOGIC, MATHEMATICAL PREDICTION,

***RECOIL MECHANISMS**

AD-272 990 62-2-4 DIV. 22
FRANKFORD ARSENAL, PHILADELPHIA, PA,
(ORDNANCE, *STORAGE, HUMIDITY, DETERIORATION, TESTS, *HOWITZERS, *RECOIL MECHANISMS, CORROSION,)

***RECOMBINATION REACTIONS**

AD-272 582 62-2-4 DIV. 25
OBSERVATOIRE DE PARIS-MEUDON (FRANCE),
(*GLOW DISCHARGES OF NITROGEN, HELIUM, *RARE GASES,) (ELECTRONS, DISSOCIATION ELECTRON TRANSITIONS, *TRANSPORT PROPERTIES *RECOMBINATION REACTIONS,) (INSTRUMENTATION AND MEASUREMENT OF ELECTRICAL CONDUCTANCE,)

AD-272 583 62-2-4 DIV. 25
OBSERVATOIRE DE PARIS-MEUDON (FRANCE),
(*NITROGEN, *GLOW DISCHARGES, IONS, ELECTRONS,) (*RECOMBINATION REACTIONS, TRANSPORT PROPERTIES, EXCITATION, INFRARED RADIATION, DISSOCIATION, ULTRAVIOLET RADIATION,) (DISTRIBUTION THEORY, PROBABILITY, SPECTROGRAPHIC DATA, PHOTOMETERS,)

AD-272 770 62-2-4 DIV. 6
SHEFFIELD U. (GT. BRIT.),
(*IODINE, ATOMS, GASES, MIXTURES, NITROGEN COMPOUNDS, OXIDES AND NEON, *RECOMBINATION REACTIONS, ASORPTION,) (COMPLEX IONS, PHOTOLYSIS, REACTION KINETICS, HEAT OF FORMATION,) GREAT BRITAIN,

AD-272 954 62-2-4 DIV. 25
GENERAL ATOMIC DIV., GENERAL DYNAMICS CORP., SAN DIEGO, CALIF.
(EXCITATION OF *ELECTRONS IN GASES, SEMICONDUCTORS AND METALS,) (*RECOMBINATION REACTIONS, *TRANSPORT PROPERTIES, IONIZATION,) (SECONDARY EMISSION, NUCLEAR ENERGY, GAMMA RAYS, CONDUCTIVITY,) (ELECTRONI EQUIPMENT, CAPACITORS, RESISTORS, TRANSISTORS, TRANSMISSION LINES, ELECTRIC CABLES,)

***RECOVERY**

AD-272 857 62-2-4 DIV. 9
SPACE RECOVERY SYSTEMS, INC., EL SEGUNDO, CALIF.
(SOUNDING ROCKETS, *SPACE CAPSULES, INSTRUMENTATION, AERODYNAMIC CONFIGURATIONS, RE-ENTRY VEHICLES, RE-ENTRY AERODYNAMICS, HYPERSONICS, AERODYNAMIC HEATING, HEAT TRANSFER, DRAG, DECELERATION, PARACHUTES, PARACHUTE DESCENTS, *RECOVERY, MATHEMATICAL ANALYSIS, FEASIBILITY STUDIES,)

***RE-ENTRY VEHICLES**

AD-272 629 62-2-4 DIV. 25
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON,
(ELECTRONS, DENSITY IN WAKE OF *HYPERVELOCITY PROJECTILES OR PELLETS,) (*RE-ENTRY VEHICLES, SIMULATION,)

AD-272 901 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*GLIDERS, AIRPLANE MODELS, *IND TUNNEL MODELS, AIRCRAFT CANOPIES, PNEUMATIC DEVICES, AERODYNAMIC CONFIGURATIONS, AERODYNAMIC HEATING, RE-ENTRY AERODYNAMICS, HYPERSONICS, STABILITY, STABILITY (LONGITUDINAL), FRICTION, SHEAR STRESSES, LIFT, DRAG, AERODYNAMICS, MODEL TESTS,) (*RE-ENTRY VEHICLES, TRIANGULAR WINGS, DECELERATION, RECOVERY, LANDING, AIRPLANE LANDING,)

***REFRACTION**

AD-272 586 62-2-4 DIV. 25
SYRACUSE U. RESEARCH INST., N. Y.
(ANALYSIS, *ATMOSPHERE, *REFRACTION,) (OPTICS, LIGHT, DENSITY, *REFRACTIVE INDEX, OPTICAL IMAGES,) (*AERIAL PHOTOGRAPY, *MAPPING,)

AD-272 764 62-2-4 DIV. 2
MICHIGAN U. COLL. OF ENGINEERING, ANN ARBOR,
(*ATMOSPHERE, *METEOROLOGICAL DATA, COLLECTING METHODS, DENSITY, TEMPERATURE, BAROMETRIC PRESSURE, *SATELLITE VEHICLES,) (ATMOSPHERE, LIGHT, *REFRACTION, LIGHT TRANSMISSION, STARS,)

***REFRACTIVE INDEX**

AD-272 586 62-2-4 DIV. 25
SYRACUSE U. RESEARCH INST., N. Y.
(ANALYSIS, *ATMOSPHERE, *REFRACTION,) (OPTICS, LIGHT, DENSITY, *REFRACTIVE INDEX, OPTICAL IMAGES,) (*AERIAL PHOTOGRAPY, *MAPPING,)

***REFRACTORY MATERIALS**

AD-272 533 62-2-4 DIV. 25
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*THERMODYNAMICS, *CERMETS, *REFRACTORY MATERIALS, HIGH TEMPERATURE RESEARCH,) (MEASUREMENT, THERMAL DIFFUSION, HEAT TRANSFER, THERMAL CONDUCTIVITY, SPECIFIC HEAT, RINGS, EDGES, CYLINDRICAL BODIES,) (GALVANOMETERS, OPTICAL INSTRUMENTS, PYROMETERS,) PHYSICAL PROPERTIES,

AD-272 614 62-2-4 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*REFRACTORY MATERIALS, OXIDES, CHROMIUM COMPOUNDS, ALUMINUM COMPOUNDS,) (*CERAMIC MATERIALS, *CERMETS, SILICON COMPOUNDS, CARBIDES, NITRIDES, CHROMIUM COMPOUNDS, ALUMINUM COMPOUNDS, OXIDES, *FLAME SPRAYING,) (*HEAT RESISTANT ALLOYS, NICKEL ALLOYS, CHROMIUM ALLOYS, IRON ALLOYS,) (HIGH TEMPERATURE RESEARCH, MEASUREMENT OF *BLACKBODY RADIATION,) (TEMPERATURE CONTROL, SUPERSONC PLANES, HYPERSONICS,) *HEAT RESISTANT PAINTS,

AD-272 697 62-2-4 DIV. 17
PROPELLEX CHEMICAL DIV., CHROMALLOY CORP., EDWARDSVILLE, ILL.
(HEAT RESISTANT ALLOYS, *REFRACTORY MATERIALS, MOLYBDENUM ALLOYS, TITANIUM ALLOYS, TUNGSTEN, SHEETS, *EXPLOSIVE FORMING,) (DEFORMATION, VELOCITY, MEASUREMENT, INSTRUMENTATION, MAGNETS, INDUCTANCE, COILS, ELECTRIC POTENTIAL, VOLTAGE,) ALLOYS, METALS,

AD-272 788 62-2-4 DIV. 18
BJORKSTEN RESEARCH LABS., INC., MADISON, WIS.
(*REFRACTORY MATERIALS, *CERAMIC FIBERS, THERMAL INSULATION, FIBERS,) (*SILICON COMPOUNDS, *DIOXIDES, ADDITIVES, CHROMIUM COMPOUNDS, OXIDES, MOLYBDENUM COMPOUNDS, SILICIDES, COPPER,) (TESTS, VISCOSITY, DETERMINATION BY DEFORMATION, RODS, FIBERS, ABLATION, RESISTANCE, BLACKBODY RADIATION,) GUIDED MISSILE NOSES, ROCKET MOTOR NOZZLES, PLASTICS, REINFORCING MATERIALS,

AD-272 835 62-2-4 DIV. 25
CINCINNATI U., OHIO.
(*CERAMIC MATERIALS, *REFRACTORY MATERIALS, *THERMODYNAMICS, HIGH TEMPERATUR RESEARCH, CRYSTALS, LATTICES,) (ELECTROLYTC CELLS, IRON COMPOUNDS, OXIDES, ELECTRIC POTENTIAL,) (*CHROMIUM COMPOUNDS AND *ZIRCONIUM COMPOUNDS, *OXIDES,) (CHROMIUM ALLOYS, NICKEL ALLOYS,) (THEORY, *PHASE STUDIES, X-RAY DIFFRACTION ANALYSIS, METALLURGICAL ANALYSIS,)

***RELAXATION TIME**

AD-272 843 62-2-4 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE,
(SOLID STATE PHYSICS, *MASERS IN PARAMAGNETIC CRYSTALS, *PARAMAGNETIC RESONANCE,) (*RUBY, CRYSTAL STRUCTURE, LATTICS, *RELAXATION TIME, NUCLEAR SPINS, POLARIZATION,) (QUANTUM MECHANICS, *NUCLEAR ENERGY LEVELS, ELECTROMAGNETIC FIELDS,) (TESTS AN MEASUREMENT BY INSTRUMENTATION, KLYSTRONS, OSCILLOSCOPES, PULSE GENERATORS, WAVEMETERS,)

***RESEARCH PROGRAM ADMINISTRATION**

AD-272 565 62-2-4 DIV. 2
ARCTIC INST. OF NORTH AMERICA, WASHINGTON, D.C.
(*TERRAIN, ANALYSIS OF *ARCTIC REGIONS.) (ENGINEERING, PHYSICAL PROPERTIESOF *ICE.) (*RESEARCH PROGRAM ADMINISTRATION IN OCEANOGRAPHY, METEOROLOGY, GEOLOGY, THERMAL RADIATION, MARINE BIOLOGY, GLACIERS AND GEOPHYSICS.) *BIBLIOGRAPHY.

AD-272 828 62-2-4 DIV. 30
RAND CORP., SANTA MONICA, CALIF.
(*RESEARCH PROGRAM ADMINISTRATION, ANALYSIS, SCIENTIFIC ORGANIZATIONS, SCIENTIFIC RESEARCH, INDUSTRIAL RESEARCH, MILITARY RESEARCH.)

AD-272 844 62-2-4 DIV. 30
PLANNING RESEARCH CORP., LOS ANGELES, CALIF.
(*RESEARCH PROGRAM ADMINISTRATION, SIMULATION, TEST FACILITIES, DESIGN, COSTS.) (WAR POTENTIAL, MILITARY INTELLIGENCE, MILITARY OPERATIONS, ANALYSIS.) (WARFARE, PROBABILITY.) COMPUTERS.

AD-272 847 62-2-4 DIV. 12
RAND CORP., SANTA MONICA, CALIF.
(*SPACE FLIGHT, SPACE PROBES, LUNAR PROBES, SATELLITE VEHICLES, SPACESHIP, MANNED, USSR.) (*ROCKET MOTORS, STAGING, ROCKET PROPULSION, THRUST, LAUNCHING, STABILIZATION.) (GUIDED MISSILE RESEARCH, *RESEARCH PROGRAM ADMINISTRATION.)

AD-272 931 62-2-4 DIV. 26
AEROSPACE CORP., INGLEWOOD, CALIF.
(*MANAGEMENT ENGINEERING, ANALYSIS, SCHEDULING, PRODUCTION, *RESEARCH PROGRAM ADMINISTRATION.)

***RESEARCH REACTORS**

AD-272 535 62-2-4 DIV. 20
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*RESEARCH REACTORS, PULSE TRANSMITTERS, FAST REACTORS, CRITICAL ASSEMBLIES, SUPERCRITICAL ASSEMBLIES, NEUTRONS, *NEUTRON FLUX DENSITY, *FISSION NEUTRONS, HEAT TRANSFER, FISSION PRODUCTS, NUCLEAR ENERGY.) USSR.

***RESIN ADHESIVES**

AD-272 981 62-2-4 DIV. 14
NAMPCO INDUSTRIES INC., SAN DIEGO, CALIF.
(HIGH TEMPERATURE RESEARCH, *ADHESIVES, *RESIN ADHESIVES, *HEAT RESISTANT POLYMERS, RESINS, PHENOLIC RESINS, SILICONE RESINS, EPOXY RESINS, *LAMINATES, BINDERS, SYNTHESIS, PYROLYSIS, CHEMICAL REACTIONS.) (TESTS, OXIDATION RESISTANCE, TENSILE PROPERTIES, TEMPERATURE, STABILITY, BONDING, MECHANICAL PROPERTIES.) ROCKET MOTOR NOZZLES.

***RESISTANCE**

AD-272 561 62-2-4 DIV. 17
COLUMBIA U., NEW YORK.
(*COPPER ALLOYS, *GOLD ALLOYS, *PHASE STUDIES, PHASE TRANSITIONS, COPPER COMPOUNDS, GOLD COMPOUNDS, *MOLECULAR ASSOCIATION, *RESISTANCE, ELECTRICAL PROPERTIES, THERMOELECTRICITY, MECHANICAL PROPERTIES, ELASTICITY, HIGH TEMPERATURE RESEARCH, THEORY.)

***RESISTORS**

AD-272 530 62-2-4 DIV. 7
INTERNATIONAL RESISTANCE CO., PHILADELPHIA, PA.
(*FIXED RESISTORS, *RESISTORS, PRODUCTION, PROCESSING, *MANUFACTURING METHODS.) (MATERIALS, FILMS, COATINGS, CARBON ALLOYS, OXIDATION INHIBITION, MOLDING, MOLDING MATERIALS, RELIABILITY, TESTS, LIFE EXPECTANCY.)

AD-272 651 62-2-4 DIV. 7
GENERAL INSTRUMENT CORP., *DUNSOCKET, N. J.
(*RESISTORS, WIRE-WINDING MACHINES, INSULATING MATERIALS, PRODUCTION, DESIGN, MANUFACTURING METHODS.)

***RETINA**

AD-272 774 62-2-4 DIV. 16
RUTGERS U., NEW BRUNSWICK, N. J.
(*RETINA, *COLOR VISION, RECORDING DEVICES.) (*EYE, PHYSIOLOGY, SENSITIVITY, STIMULATION, VISUAL THRESHOLD, MONOCHROMATIC LIGHT.) (*OPTICAL IMAGES, MEASUREMENT.)

***RIVETS**

AD-272 526 62-2-4 DIV. 26
MCDONNELL AIRCRAFT CORP., ST. LOUIS, MO.
(*MOLYBDENUM ALLOYS, TITANIUM ALLOYS, ZIRCONIUM ALLOYS, SHEETS, *NIOBIUM, RIVETS, BOLTS, NUTS (MECHANICS)), (METAL JOINTS, BOLTED JOINTS, RIVETED JOINTS, *COATINGS, METAL COATINGS, ANTIOXIDANTS, SILICON COATINGS, REFRACTORY COATINGS, ALUMINUM COATINGS, CHROMIUM COMPOUNDS, NIOBIUM, MOLYBDENUM,) (TEMPLATES, CHEMICAL MILLING, FORGING,) (HIGH TEMPERATURE RESEARCH, STRUCTURES, SPACESHIPS, AIRFRAMES, DESIGN.)

***ROCKET CASES**

AD-272 560 62-2-4 DIV. 27
AEROJET-GENERAL CORP., AZUSA, CALIF.
(*ROCKET CASES, *FILAMENT WOUND CONSTRUCTION, MATERIALS, FIBERS, *SYNTHETIC FIBERS, FILAMENTS, GLASS TEXTILES, IMPREGNATION, COATINGS, RESINS, HEAT RESISTANT POLYMERS,) HIGH PRESSURE RESEARCH, HIGH TEMPERATURE RESEARCH, TENSILE PROPERTIES, FAILURE (MECHANICS), TESTS.

AD-272 630 62-2-4 DIV. 14
ROCKETDYNE, CANOGA PARK, CALIF.
(*ROCKET CASES, PROPELLANT TANKS, CYLINDRICAL BODIES, *FILAMENT WOUND CONSTRUCTION, MANUFACTURING METHODS, PROCESSING,) (FIBERS, *SYNTHETIC FIBERS, *GLASS TEXTILES, IMPREGNATION, RESINS, EPOXY RESINS, LAMINATS,) (TESTS, PRESSURE, TENSILE PROPERTIES,) *FIRE WINDING MACHINES.

AD-272 652 62-2-4 DIV. 27
KIDDE, WALTER, AND CO., INC., BELLEVILLE, N. J.
(*ROCKET CASES, GLASS TEXTILE, FILAMENT WOUND CONSTRUCTION, DESIGN,) (MODEL TESTS, HYDROSTATIC PRESSURE, HEMISPHERICAL SHELLS, DEFLECTION, EQUATIONS,) (GUIDED MISSILES, UNDERWATER TO SURFACE,) DATA.

AD-272 656 62-2-4 DIV. 26
MASSACHUSETTS INST. OF TECH., DIV. OF SPONSORED RESEARCH, CAMBRIDGE.
(*ROCKET CASES, *WELDING, *STEEL, SHEETS, PROCESSING, MANUFACTURING METHODS,) (ARC WELDING BY ELECTRODES, TUNGSTEN, GASES, SHIELDING VS ELECTRON BEAMS, *WELDS, MECHANICAL PROPERTIES, FRACTURE (MECHANICS), HARDENING, EFFECTIVENESS, HEAT TREATMENT,)

AD-272 793 62-2-4 DIV. 17
LYON, INC., DETROIT, MICH.
(*DRAWING (MACHINE PROCESSING), *ROCKET CASES, AUSTENITE, *STEEL,) (PROCESSING, MANUFACTURING METHODS, ROCKET MOTORS, COMBUSTION CHAMBERS, HEAT TREATMENT, DEFORMATION, PLASTIC FLOW, PLASTICITY, HARDENING, TEMPERATURE, MECHANICAL PROPERTIES, TENSILE PROPERTIES,) (TOOLS, DIES, DESIGN,)

AD-272 886 62-2-4 DIV. 27
BENDIX SYSTEMS DIV., BENDIX CORP., SOUTH BEND IND.
(STRUCTURES, *ROCKET CASES, PRESSURE VESSELS, FILAMENT WOUND CONSTRUCTION, *GLASS TEXTILES, REINFORCING MATERIALS, *PLASTICS, RESINS, LAMINATES,) (TESTS, TEST EQUIPMENT, TEST METHODS, STRESSES, DEFORMATION,)

***ROCKET LAUNCHERS**

AD-272 619 62-2-4 DIV. 22
ORDNANCE MISSILE, WHITE SANDS MISSILE RANGE, N. MEX.
(SIMULATION OF *STRESSES, ANALYSIS ON *ROCKET LAUNCHERS DURING TRANSPORTATION OVER ROADS,) (ROCKET LAUNCHERS, STRUCTURES, *COATINGS, FATIGUE (MECHANICS), STRAIN GAGES, CALIBRATION, TESTS,) ROCKETS, SURFACE TO SURFACE.

***ROCKET MOTOR NOZZLES**

AD-272 564 62-2-4 DIV. 27
GENERAL ELECTRIC CO., CINCINNATI, OHIO.
(*ROCKET MOTOR NOZZLES, *TUNGSTEN, SHEETS, PROCESSING, *MANUFACTURING METHODS,) (TOOLS, DESIGN,) (CONICAL BODIES OF METAL PLATES, PRODUCTION, LATHES,)

AD-272 977 62-2-4 DIV. 26
ROLLA METALLURGY RESEARCH CENTER, BUREAU OF MINES, MO.
(METAL COATINGS BY *VAPOR PLATING OF *TUNGSTEN BY PYROLYSIS OF MIXTURES OF GASES, HYDROGEN, TUNGSTEN COMPOUNDS, FLUORIDES,) (GRAINS (METALLURGY), CRYSTAL STRUCTURE, MICROSTRUCTURE, HARDNESS, CHEMICAL IMPURITIES, SILICON,) *ROCKET MOTOR NOZZLES, COATINGS, METALLIC SMOKE DEPOSITS.

***ROCKET MOTORS**

AD-272 847 62-2-4 DIV. 12
RAND CORP., SANTA MONICA, CALIF.
(*SPACE FLIGHT, SPACE PROBES, LUNAR PROBES, SATELLITE VEHICLES, SPACESHIP, MANNED, USSR.) (*ROCKET MOTORS, STAGING, ROCKET PROPULSION, THRUST, LAUNCHING, STABILIZATION,) (GUIDED MISSILE RESEARCH, *RESEARCH PROGRAM ADMINISTRATION,)

***ROCKET OXIDIZERS**

AD-272 992 62-2-4 DIV. 10
ROCKET PROPULSION ESTABLISHMENT (GT. BRIT.),
(*ROCKET OXIDIZERS, LIQUID ROCKET PROPELLANTS, *LIQUEFIED GASES, *OXYGEN, *DENSITY, PRESSURE, TEMPERATURE, LOW TEMPERATURE RESEARCH, THEORY, MATHEMATICAL ANALYSIS,) TABLES, GREAT BRITAIN.

***ROCKET PROPELLANTS**

AD-272 836 62-2-4 DIV. 25
AVCO RESEARCH LAB., EVERETT, MASS.
(*MAGNETOHYDRODYNAMICS, GENERATORS IN *NUCLEAR PROPULSION,) (ROCKET PROPULSION, *ROCKET PROPELLANTS, *NUCLEAR POWER PLANTS, DESIGN,) (THERMODYNAMICS, HEAT TRANSFER, ENTROPY, HEAT EXCHANGERS, THRUST AUGMENTOR NOZZLES,)

AD-272 891 62-2-4 DIV. 10
ROCKET PROPULSION ESTABLISHMENT (GT. BRIT.),
(GUIDED MISSILES, *ROCKET PROPELLANTS, ROCKET PROPULSION, PROPELLANT PROPERTIES, THERMODYNAMICS, MATHEMATICAL ANALYSIS, THEORY,) GREAT BRITAIN.

AD-272 909 62-2-4 DIV. 25
AEROCHEM RESEARCH LABS., INC., PRINCETON, N. J.
(*HEAT TRANSFER AND THERMAL CONDUCTIVITY OF *ROCKET PROPELLANTS TO SOLIDS,) (*TRANSPORT PROPERTIES AND COMBUSTION OF GASES, AIR, ETHYLENE, OXYGEN, HYDROGEN,) (*EXPLOSIONS IN PRESSURE CAPSULES, TEMPERATURE, PRESSURE, THERMODYNAMICS, HIGH-PRESSURE RESEARCH, COOLING,) (INSTRUMENTATION AND LABORATORY EQUIPMENT,) (FUNCTIONS, PARTIAL DIFFERENTIAL EQUATIONS,)

***ROTATING STRUCTURES**

AD-272 549 62-2-4 DIV. 25
ILLINOIS INST. OF TECH., CHICAGO.
(*CYLINDRICAL BODIES, *ROTATING STRUCTURES, ROTATION, *STRESSES, *ELASTICITY, PLASTICITY,) (STRESSES, MATHEMATICAL ANALYSIS,)

***ROTOR BLADES**

AD-272 903 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D.C.
(*CAVITATION, RELIABILITY, TESTS OF *ROTOR BLADES, *FLUID FLOW, HYDRODYNAMIC, WATER,) (INSTRUMENTATION, VACUUM PUMPS, HEAT EXCHANGERS, VENTURI TUBES, TRANSDUCERS,) (CENTRIFUGAL PUMPS, VAPOR PRESSURE,) PHOTOGRAPHIC ANALYSIS.

***RUBIDIUM**

AD-272 620 62-2-4 DIV. 25
INSTITUTE OF OPTICS, U. OF ROCHESTER, N. Y.
(*ALKALI METALS, *RUBIDIUM, HYDROGEN, ATOMS, VAPORS, *HYPERFINE STRUCTURE, NUCLEAR SPINS, RELAXATION TIME, ATOMIC ENERGY LEVELS, DETECTION BY OPTICS,) (PROGRAMMING, DIGITAL COMPUTERS,) OPTICAL EQUIPMENT.

***RUBY**

AD-272 843 62-2-4 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
(SOLID STATE PHYSICS, *MASERS IN PARAMAGNETIC CRYSTALS, *PARAMAGNETIC RESONANCE,) (*RUBY, CRYSTAL STRUCTURE, LATTICS, *RELAXATION TIME, NUCLEAR SPINS, POLARIZATION,) (QUANTUM MECHANICS, *NUCLEAR ENERGY LEVELS, ELECTROMAGNETIC FIELDS,) (TESTS AN MEASUREMENT BY INSTRUMENTATION, KLYSTRONS, OSCILLOSCOPES, PULSE GENERATORS, WAVEMETERS,)

***SAND**

AD-272 681 62-2-4 DIV. 22
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
(*UNDERGROUND EXPLOSIONS, BLAST, *CRATERING, *SAND, *CLAYS, TESTS, TEST METHODS,) (SAND, CLAYS, PARTICLES, ACCELERATION, MEASUREMENT,)

***SATELLITE ATTITUDE**

AD-272 694 62-2-4 DIV. 12
AMERICAN RADIATOR AND STANDARD SANITARY CORP., MOUNTAIN VIEW, CALIF.
(SPACESHIPS, SATELLITE VEHICLES, *SATELLITE ATTITUDE, *CONTROL SYSTEMS BY JETS, DESIGN,) (WATER, *WATER VAPOR, PROPANES, ROCKET FUELS, VAPOR PRESSURE, VAPORIZATION, VAPORS, JETS, EJECTION, SPECIFIC IMPULSE, THRUST,)

•SATELLITE VEHICLE RESEARCH

AD-272 904 62-2-4 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON• D. C.
(•SATELLITE VEHICLE RESEARCH• MOTION AND •ORBITAL FLIGHT PATHS OF SATELLITE VEHICLES.) (•CELESTIAL MECHANICS• HARMONIC ANALYSIS• TRANSFORMATIONS (MATHEMATICS)• POLYNOMIALS• PARTIAL DIFFERENTIAL EQUATIONS.)

•SATELLITE VEHICLES

AD-272 663 62-2-4 DIV. 8
IONOSPHERE RESEARCH LAB.• PENNSYLVANIA STATE U.• UNIVERSITY PARK.
(ANALYSIS• •IONOSPHERE• MAGNETO-OPTIC ROTATION• •RADIO TRANSMISSION• •SATELLITE VEHICLES.) (MEASUREMENT• MAGNETO-OPTIC ROTATION• RADIO SIGNALS• SATELLITE VEHICLES) (MEASUREMENT• DENSITY• ELECTRONS• IONOSPHERE.)

AD-272 764 62-2-4 DIV. 2
MICHIGAN U. COLL. OF ENGINEERING• ANN ARBOR.
(•ATMOSPHERE• •METEOROLOGICAL DATA• COLLECTING METHODS• DENSITY• TEMPERATURE• BAROMETRIC PRESSURE• •SATELLITE VEHICLES.) (ATMOSPHERE• LIGHT• •REFRACTION• LIGHT TRANSMISSION• STARS.)

AD-272 830 62-2-4 DIV. 12
LINCOLN LAB.• MASS. INST. OF TECH.• LEXINGTON.
(•SATELLITE VEHICLES• SPACE FLIGHT• •MOTION• ORBITAL FLIGHT PATHS.) (PERTURBATION THEORY• AERODYNAMICS• DRAG• TERRESTRIAL MAGNETISM• MAGNETIC FIELDS• GRAVITY• METEORITES• HAZARDS• TORQUE.) •BIBLIOGRAPHY.

AD-272 869 62-2-4 DIV. 12
LINCOLN LAB.• MASS. INST. OF TECH.• LEXINGTON.
(•SATELLITES AND •SATELLITE VEHICLES IN •ORBITAL FLIGHT PATHS AROUND TH CELESTIAL MECHANICS• EARTH.) (TRANSFORMATIONS (MATHEMATICS)• TAYLOR'S SERIES• MATRIX ALGEBRA• PARTIAL DIFFERENTIAL EQUATIONS.)

AD-272 875 62-2-4 DIV. 7
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON• D. C.
•TIME SWITCHES• •COMMUTATORS FOR •TELEMETER SYSTEMS IN •SATELLITE VEHICLES.

AD-272 950 62-2-4 DIV. 12
AEROSPACE CORP.• LOS ANGELES• CALIF.
(MATHEMATICAL ANALYSIS OF •SATELLITE VEHICLES• INJECTION INTO •ORBITAL FLIGHT PATHS ABOUT EARTH A HIGH ALTITUDE.) (EXTERIOR BALLISTICS• CELESTIAL MECHANICS.)

AD-272 971 62-2-4 DIV. 12
AIR FORCE CAMBRIDGE RESEARCH LABS.• BEDFORD• MASS.
(INTERFEROMETERS• DIRECTION FINDING• ANTENNAS• DOPPLER SYSTEMS FOR •TRACKING• •SATELLITE VEHICLES.) (RADIO-FREQUENCY FILTERS FOR •DOPPLER TRACKING OF SATELLITE VEHICLES.) SATELLITE VEHICLE TRAJECTORIES• ORBITAL FLIGHT PATHS.

AD-272 979 62-2-4 DIV. 6
BATTELLE INSTITUTE• FRANKFURT/MAIN (GERMANY).
(•SATELLITE VEHICLES• NAVIGATION• •DOPPLER TRACKING• •DOPPLER NAVIGATION• TRACKING• •RADIO STATIONS• RADIO RECEIVERS• VERY HIGH FREQUENCY• DIPOLE ANTENNAS• MAGNETIC RECORDING SYSTEMS• RADIO EQUIPMENT• INSTRUMENTATION• INSTALLATION.) GERMANY.

•SATELLITES

AD-272 869 62-2-4 DIV. 12
LINCOLN LAB.• MASS. INST. OF TECH.• LEXINGTON.
(•SATELLITES AND •SATELLITE VEHICLES IN •ORBITAL FLIGHT PATHS AROUND TH CELESTIAL MECHANICS• EARTH.) (TRANSFORMATIONS (MATHEMATICS)• TAYLOR'S SERIES• MATRIX ALGEBRA• PARTIAL DIFFERENTIAL EQUATIONS.)

•SCATTERING

AD-272 576 62-2-4 DIV. 2
HIGH ALTITUDE OBSERVATORY• BOULDER• COLO.
(•SOLAR CORONA• •LIGHT• •SCATTERING BY AEROSOLS.) (ASTROPHYSICS• SOLAR ATMOSPHERE• PARTICLES• LIGHT TRANSMISSION.) THESES.

AD-272 797 62-2-4 DIV. 20
LOCKHEED AIRCRAFT CORP.• SUNNYVALE• CALIF.
(•SCATTERING• •TRANSPORT PROPERTIES• DIFFERENTIAL CROSS SECTION• •ATOMS• •IONS• ELECTRONS.) (NUCLEAR ENERGY• NUCLEAR REACTIONS• THERMONUCLEAR REACTIONS.) •BIBLIOGRAPHY.

•SCIENTIFIC REPORTS

AD-272 650 62-2-4 DIV. 3
NAVAL BIOLOGICAL LAB.• U. OF CALIF.• OAKLAND.
(•MEDICAL RESEARCH• •SCIENTIFIC REPORTS.) (COCCIDIOIDES• IMMUNOLOGY.) •BIBLIOGRAPHY• •AEROBIOLOGY• PASTEURELLA• VIRUS DISEASES• EPIDEMIOLOGY• BIOPHYSICS• MEDICAL EQUIPMENT.

•SCIENTIFIC RESEARCH

AD-272 806 62-2-4 DIV. 8
STANFORD ELECTRONICS LABS.• STANFORD U.• CALI.
(•SOLID STATE PHYSICS• •ELECTRONICS• •SCIENTIFIC RESEARCH.) (•MICROWAVE OSCILLATORS• •MICROWAVE AMPLIFIERS• •MASERS• SWITCHING CIRCUITS• MATHEMATICAL ANALYSIS• •ELECTRONIC SWITCHES.) (•SEMICONDUCTORS• LATTICES• IONS.) (INFRARED SPECTROSCOPY• EXTREMELY HIGH FREQUENCY• MASERS• PARAMETRIC AMPLIFIERS.) (X BAND• CAVITY RESONATORS.) (SEMICONDUCTORS• SILICON• GERMANIUM• GALLIUM COMPOUNDS• ARSENIDES.) (DIGITAL SYSTEMS• DATA PROCESSING SYSTEMS• SOLID STATE PHYSIC.)

•SECONDARY EMISSION

AD-272 556 62-2-4 DIV. 25
•ILLIAMSON DEVELOPMENT CO.• INC.• •EST CONCORD• MASS.
(•PLASMA OSCILLATIONS• GAS IONIZATION• •GAS DISCHARGES• HELIUM• HYDROGEN.) (BETATRONS• PARTICLES• ORBITAL FLIGHT PATHS• ELECTRONS• •ELECTRON BEAMS• •SECONDARY EMISSION.) •LOW PRESSURE RESEARCH.

AD-272 771 62-2-4 DIV. 25
POMONA COLL.• CLAREMONT• CALIF.
(•X-RAY SPECTROSCOPY• X RAYS• REFLECTION• ABSORPTION• DIFFRACTION• FLUORESCENCE• •SECONDARY EMISSION.) (X-RAY SPECTROSCOPY• CRYSTALS• CELLS (BIOLOGY).) (CRYSTALS •MICROSTRUCTURE• METALLIC CRYSTALS• ELECTRON DIFFRACTION ANALYSIS.)

•SEMICONDUCTORS

AD-272 624 62-2-4 DIV. 25
SHOCKLEY TRANSISTOR CORP.• PALO ALTO• CALIF.
(•FAILURE (MECHANICS)• •SILICON• •SEMICONDUCTORS• DIFFUSION• GALLIUM• GRAINS (METALLURGY)• CRYSTAL STRUCTURE• LATTICES• DEFORMATION• CHEMICAL IMPURITIES• OXYGEN• SURFACES• CONTAMINATION.) ELECTRICAL PROPERTIES• PHOTOELECTRIC EFFECT.

AD-272 775 62-2-4 DIV. 8
DAVID SARNOFF RESEARCH CENTER• PRINCETON• N. J.
(•SEMICONDUCTORS• •THERMIONIC EMISSION• •PHOTOEMISSION• FIELD EMISSION• SURFACE PROPERTIES• CONDUCTIVITY• CRYSTAL STRUCTURE• LUMINESCENCE• MEASUREMENT.) (CRYSTALS• SILICON• CESIUM• TUNGSTEN• ARGON• DIFFUSION• SURFACES• THICKNESS• PROCESSING• PREPARATION.)

AD-272 806 62-2-4 DIV. 8
STANFORD ELECTRONICS LABS.• STANFORD U.• CALI.
(•SOLID STATE PHYSICS• •ELECTRONICS• •SCIENTIFIC RESEARCH.) (•MICROWAVE OSCILLATORS• •MICROWAVE AMPLIFIERS• •MASERS• SWITCHING CIRCUITS• MATHEMATICAL ANALYSIS• •ELECTRONIC SWITCHES.) (•SEMICONDUCTORS• LATTICES• IONS.) (INFRARED SPECTROSCOPY• EXTREMELY HIGH FREQUENCY• MASERS• PARAMETRIC AMPLIFIERS.) (X BAND• CAVITY RESONATORS.) (SEMICONDUCTORS• SILICON• GERMANIUM• GALLIUM COMPOUNDS• ARSENIDES.) (DIGITAL SYSTEMS• DATA PROCESSING SYSTEMS• SOLID STATE PHYSIC.)

•SHEETS

AD-272 779 62-2-4 DIV. 17
SOUTHERN RESEARCH INST.• BIRMINGHAM• ALA.
(•STAINLESS STEEL• HEATING• HIGH TEMPERATURE RESEARCH• LOADING• THERMODYNAMICS.) (•NIOBIUM• •TANTALUM• AGING• DEFORMATION• ELASTICITY• FRACTURE (MECHANICS).) (•SHEETS• HEAT TREATMENT• STRESSES• TENSILE PROPERTIES• MECHANICAL PROPERTIES• FAILURE (MECHANICS)• THEORY• MATHEMATICAL ANALYSIS• TEST METHODS.) (AIRCRAFT• MATERIALS• REFRACTORY MATERIALS.)

•SHELTERS

AD-272 871 62-2-4 DIV. 20
NUCLEAR DEFENSE LAB.• ARMY CHEMICAL CENTER• MD.
(•SHELTERS• CONCRETE• ROOFS• •GAMMA RAYS• •PENETRATION• MEASUREMENT• TABLES.) (RADIOACTIVE ISOTOPES• COBALT• CESIUM.) (AIR RAID SHELTERS• RADIOACTIVE FALL-OUT• GAMMA RAYS• PENETRATION.)

•SHIELDING

AD-272 876 62-2-4 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON• D. C.
(•SHIELDING OF CONICAL BODIES• •SPACESHIPS FROM THERMAL RADIATION• •SOLAR ENERGY.) (TEMPERATURE AND HEAT TRANSFER• CONTROL SYSTEMS• THERMAL CONDUCTIVITY OF MATERIALS.) (FUNCTIONS• INTEGRAL EQUATIONS.)

•SHIP HULLS

AD-272 885 62-2-4 DIV. 31
DAVID TAYLOR MODEL BASIN• WASHINGTON• D. C.
(•NAVAL VESSELS FOR LAUNCHING• •GUIDED MISSILES• •SHIP HULLS• VIBRATION• TESTS.) (•CARGO SHIPS• •MERCHANT VESSELS• SHIP HULLS• VIBRATION• TESTS.)

•SHOCK TUBES

AD-272 532 62-2-4 DIV. 25
FOREIGN TECH. DIV.• AIR FORCE SYSTEMS COMMAND• •RIGHT-PATTERSON AIR FORCE BASE• OHIO.
(•HEAT TRANSFER• THERMAL CONDUCTIVITY OF •GAS FLOW• SHOCK •AVES IN •SHOCK TUBES• PLASMA PHYSICS• ELECTRIC DISCHARGES.) (•TRANSDUCERS• THIN FILMS• GLASS• DIELECTRICS• PLATINUM.) USSR.

AD-272 821 62-2-4 DIV. 25
MARYLAND U.• COLLEGE PARK.
(PLASMA PHYSICS• •SHOCK •AVES• •AVE TRANSMISSION• •SHOCK TUBES• DESIGN• •GAS DISCHARGES• ELECTROMAGNETIC •AVES• MAGNETIC FIELDS.) (VACUUM SYSTEMS• ULTRAVIOLET RADIATION• ULTRAVIOLET SPECTROSCOPY• INSTRUMENTATION.) (MEASUREMENT OF TEMPERATURE AND DENSITY IN HYDROGEN AND HELIUM.)

•SHOCK WAVES

AD-272 596 62-2-4 DIV. 22
BROADVIEW RESEARCH CORP.• BURLINGAME• CALIF.
(RDX• •EXPLOSIONS• •BLAST• •SHOCK WAVES• •PRESSURE• MEASUREMENT• PRESSURE GAGES• TERRAIN CONFIGURATION• TERRAIN MODELS• MODEL TESTS• TEST EQUIPMENT.) (•NUCLEAR EXPLOSIONS• SIMULATION.)

AD-272 657 62-2-4 DIV. 25
RESEARCH LAB. OF ELECTRONICS• MASS. INST. OF TECH.• CAMBRIDGE.
(•MAGNETOHYDRODYNAMICS• PLASMA PHYSICS• FLUID FLOW• CONTINUUM MECHANICS• THERMAL CONDUCTIVITY• •ENERGY.) (•SHOCK •AVES• •AVE TRANSMISSION• •THERMIONIC EMISSION• •FUEL CELLS• PARAMETRIC AMPLIFIERS.)

AD-272 751 62-2-4 DIV. 25
COLUMBIA U.• NEW YORK.
(•DIFFRACTION OF •ACOUSTICS• •SHOCKWAVES AROUND WEDGES.) (WAVE TRANSMISSION• VELOCITY.) (INTEGRAL EQUATIONS• POTENTIAL THEORY.)

AD-272 821 62-2-4 DIV. 25
MARYLAND U.• COLLEGE PARK.
(PLASMA PHYSICS• •SHOCK •AVES• •AVE TRANSMISSION• •SHOCK TUBES• DESIGN• •GAS DISCHARGES• ELECTROMAGNETIC •AVES• MAGNETIC FIELDS.) (VACUUM SYSTEMS• ULTRAVIOLET RADIATION• ULTRAVIOLET SPECTROSCOPY• INSTRUMENTATION.) (MEASUREMENT OF TEMPERATURE AND DENSITY IN HYDROGEN AND HELIUM.)

AD-272 890 62-2-4 DIV. 9
GRUMMAN AIRCRAFT ENGINEERING CORP.• BETHPAGE• N. Y.
(GAS FLOW• •SUPERSONIC FLOW IN •CONICAL BODIES• •SHOCK WAVES• VELOCITY• MACH NUMBER• ANGLE-OF-ATTACK INDICATORS.) (FUNCTIONS• PARTIAL DIFFERENTIAL EQUATIONS• POLYNOMIALS• NONLINEAR SYSTEMS.) USSR.

•SILICATES

AD-272 684 62-2-4 DIV. 16
DENTAL RESEARCH FACILITY• NAVAL TRAINING CENTER• GREAT LAKES• ILL.
(DENTAL RESEARCH• •DENTAL MATERIALS• •ZINC COMPOUNDS• •OXIDES• •PHOSPHATES• •SILVER ALLOYS• •SILICATES.)

•SILICON

AD-272 624 62-2-4 DIV. 25
SHOCKLEY TRANSISTOR CORP.• PALO ALTO• CALIF.
(•FAILURE (MECHANICS)• •SILICON• •SEMICONDUCTORS• DIFFUSION• GALLIUM• GRAINS (METALLURGY)• CRYSTAL STRUCTURE• LATTICES• DEFORMATION• CHEMICAL IMPURITIES• OXYGEN• SURFACES• CONTAMINATION.) ELECTRICAL PROPERTIES• PHOTOELECTRIC EFFECT.

•SILICON COMPOUNDS

AD-272 786 62-2-4 DIV. 14
BJURKSTEN RESEARCH LABS.• INC.• MADISON• WIS.
(•REFRACTORY MATERIALS• •CERAMIC FIBERS• THERMAL INSULATION• FIBERS.) (•SILICON COMPOUNDS• •DIOXIDES• ADDITIVES• CHROMIUM COMPOUNDS• OXIDES• MOLYBDENUM COMPOUNDS• SILICIDES• COPPER.) (TESTS• VISCOSITY• DETERMINATION BY DEFORMATION• RODS• FIBERS• ABLATION• RESISTANCE• BLACKBODY RADIATION.) GUIDED MISSILE NOSES• ROCKET MOTOR NOZZLES• PLASTICS• REINFORCING MATERIALS.

***SILVER ALLOYS**

AD-272 684 62-2-4 DIV. 16
DENTAL RESEARCH FACILITY, NAVAL TRAINING CENTER, GREAT LAKES, ILL.
(DENTAL RESEARCH, *DENTAL MATERIALS, *ZINC COMPOUNDS, *OXIDES, *PHOSPHATES, *SILVER ALLOYS, *SILICATES.)

***SINTERING**

AD-272 778 62-2-4 DIV. 17
SYLVANIA ELECTRIC PRODUCTS, INC., TOWANDA, PA.
(PRODUCTION, *MOLYBDENUM, *MOLYBDENUM ALLOYS, TITANIUM ALLOYS, CARBON ALLOYS, SHEETS, *POWDER METALLURGY.) (CONTROLLED ATMOSPHERES, *SINTERING, HYDROGEN, DISSOCIATION, AMMONIA, TEMPERATURE, VACUUM FURNACES, TENSILE PROPERTIES.) (ADDITIVES, NITROGEN, OXYGEN, CARBON, TITANIUM COMPOUNDS, CARBIDES, OXIDES, NITRIDES.) ALLOYS, HEAT RESISTANT ALLOYS, PROCESSING, POWDER ALLOYS, POWDER METALS, HARDENING.

***SKIN**

AD-272 758 62-2-4 DIV. 16
LEVER BROS., CO., EDGEWATER, N. J.
(*SKIN, RATS, *ABSORPTION, *PENETRATION, AMINES, BENZENES, ORGANIC ACIDS, UREA, GLUCOSE, HISTOLOGY, CHROMATOGRAPHIC ANALYSIS.) (NUTRITION, LABORATORY ANIMALS, FATTY ACIDS, VITAMINS, LIPIDS, PROTEINS, PRIVATION.

***SLOT ANTENNAS**

AD-272 777 62-2-4 DIV. 8
SPERRY GYROSCOPE CO., GREAT NECK, N. Y.
(*SLOT ANTENNAS, *LENS ANTENNAS, *AIRPLANE ANTENNAS, *RADAR BEACONS, AIRBORNE, X BAND, IDENTIFICATION SYSTEMS, COMMERCIAL PLANES, AVIATION SAFETY, INSTALLATION, EFFECTIVENESS, ANTENNA RADIATION PATTERNS, FLIGHT TESTING.)

***SNOW**

AD-272 522 62-2-4 DIV. 2
MCGILL U. (CANADA).
(*ARCTIC REGIONS, *ALBEDO (ASTRONOMY), PERIODIC VARIATIONS, MAPS.) (ARCTIC REGIONS, *SNOW, *ICE.)

***SODIUM COMPOUNDS**

AD-272 580 62-2-4 DIV. 3
NAVAL RESEARCH LAB., WASHINGTON, D. C.
(*PYROTECHNICS, *SODIUM COMPOUNDS, *CHLORATES, FIBERS, METALLIC TEXTILS, GLASS TEXTILES, BINDERS, POWDER METALS, IRON, BARIUM COMPOUNDS, DIOXIDES, MANUFACTURING METHODS, HIGH PRESSURE RESEARCH, DENSITY, MOLDING.) (OXYGEN, PRODUCTION, SUBMARINES.) (DECOMPOSITION, CHEMICAL REACTIONS, COMBUSTION.)

***SOLAR CORONA**

AD-272 576 62-2-4 DIV. 2
HIGH ALTITUDE OBSERVATORY, BOULDER, COLO.
(*SOLAR CORONA, *LIGHT, *SCATTERING BY AEROSOLS.) (ASTROPHYSICS, SOLAR ATMOSPHERE, PARTICLES, LIGHT TRANSMISSION.) THESES.

***SOLAR DISTURBANCES**

AD-272 790 62-2-4 DIV. 25
ENRICO FERMI INST. FOR NUCLEAR STUDIES, U. OF CHICAGO, ILL.
(BALLOONS, SOLAR OBSERVATORIES.) (*COSMIC RAYS, *PROTONS, *SOLAR DISTURBANCE.)

***SOLAR ENERGY**

AD-272 876 62-2-4 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*SHIELDING OF CONICAL BODIES, *SPACESHIPS FROM THERMAL RADIATION, *SOLAR ENERGY.) (TEMPERATURE AND HEAT TRANSFER, CONTROL SYSTEMS, THERMAL CONDUCTIVITY OF MATERIALS.) (FUNCTIONS, INTEGRAL EQUATIONS.)

***SOLAR NOISE**

AD-272 794 62-2-4 DIV. 25
GEOPHYSICS CORP. OF AMERICA, BOSTON, MASS.
(*SOLAR SPECTRUM, ANALYSIS BY OPTICAL EQUIPMENT, PHOTOMETERS, PHOTOMULTIPLIERS, MEASUREMENT, PHOTONS.) (TABLES, ASTRONOMICAL DATA.) PLASMA PHYSICS, *SOLAR NOISE AND *EXTRATERRESTRIAL RADIO WAVES IN *UPPER ATMOSPHERE.

***SOLAR SPECTRUM**

AD-272 794 62-2-4 DIV. 25
GEOPHYSICS CORP. OF AMERICA, BOSTON, MASS.
(*SOLAR SPECTRUM, ANALYSIS BY OPTICAL EQUIPMENT, PHOTOMETERS, PHOTOMULTIPLIERS, MEASUREMENT, PHOTONS.) (TABLES, ASTRONOMICAL DATA.) PLASMA PHYSICS, *SOLAR NOISE AND *EXTRATERRESTRIAL RADIO WAVES IN *UPPER ATMOSPHERE.

***SOLID STATE PHYSICS**

AD-272 806 62-2-4 DIV. 6
STANFORD ELECTRONICS LABS., STANFORD U., CALIF.
(*SOLID STATE PHYSICS, *ELECTRONICS, *SCIENTIFIC RESEARCH.) (*MICROWAVE OSCILLATORS, *MICROWAVE AMPLIFIERS, *MASERS, SWITCHING CIRCUITS, MATHEMATICAL ANALYSIS, *ELECTRONIC SWITCHES.) (*SEMICONDUCTORS, LATTICES, IONS.) (INFRARED SPECTROSCOPY, EXTREMELY HIGH FREQUENCY, MASERS, PARAMETRIC AMPLIFIERS.) (X BAND, CAVITY RESONATORS.) (SEMICONDUCTORS, SILICON, GERMANIUM, GALLIUM COMPOUNDS, ARSENIDES.) (DIGITAL SYSTEMS, DATA PROCESSING SYSTEMS, SOLID STATE PHYSICS.)

AD-272 947 62-2-4 DIV. 25
AMERICAN MACHINE AND FOUNDRY CO., NILES, ILL.
(*SOLID STATE PHYSICS, *TERMINAL BALLISTICS, *PENETRATION, *METAL PLATES, ARMOR PLATE, BODY ARMOR, PROJECTILES, IMPACT SHOCK, COMPRESSION SHOCK, SHOCK WAVES, ENERGY, MOTION, THEORY.) (THERMODYNAMICS, THERMAL STRESSES, IRREVERSIBLE PROCESSES, RELAXATION TIME.) MECHANICS, CONTINUUM MECHANICS, FRACTURE (MECHANICS), FATIGUE (MECHANICS), FAILURE (MECHANICS), PHYSICAL PROPERTIES, ELASTICITY, PLASTICITY, PLASTIC FLOW, STRESSES, DEFORMATION, LATTICES, EQUATIONS OF STATE, MATHEMATICAL ANALYSIS.

***SOLIDS**

AD-272 685 62-2-4 DIV. 25
BROWN U. DIV. OF APPLIED MATHEMATICS, PROVIDENCE, R. I.
(SOLID STATE PHYSICS, STATICS AND *ELASTICITY IN *SOLIDS, SHEAR STRESSES.) (ENERGY, *POTENTIAL THEORY, TENSOR ANALYSIS *PARTIAL DIFFERENTIAL EQUATIONS, LINEAR SYSTEMS.)

***SONAR EQUIPMENT**

AD-272 587 62-2-4 DIV. 31
WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
(*TRANSDUCERS, *TOWED BODIES, *CONTAINERS, HOUSING, PACKAGING, TOWING CABLES, HOISTS, SHIPBORNE, LOAD DISTRIBUTION, STABILITY, DESIGN, TESTS.) ECHO RANGING, *SONAR EQUIPMENT.

***SOUND TRANSMISSION**

AD-272 644 62-2-4 DIV. 25
ARMY SIGNAL MISSILE SUPPORT AGENCY, WHITE SANDS MISSILE RANGE, N. MEX.
(*MATHEMATICAL ANALYSIS OF *SOUND TRANSMISSION IN ATMOSPHERE.) (SOUND, PROPAGATION, SNELL'S LAW, ROCKETS, EXTERIOR BALLISTICS, *WIND.)

***SOUNDING ROCKETS**

AD-272 689 62-2-4 DIV. 22
ARMY SIGNAL MISSILE SUPPORT AGENCY, WHITE SANDS MISSILE RANGE, N. MEX.
(*MATHEMATICAL ANALYSIS, *WIND, *SOUNDING ROCKETS.) INSTRUMENTATION, DATA PROCESSING SYSTEMS, TABLES, LEAST SQUARES METHOD.

AD-272 994 62-2-4 DIV. 2
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
(*METEORITES, *COLLECTING METHODS, *SOUNDING ROCKETS.)

***SPACE CAPSULES**

AD-272 857 62-2-4 DIV. 9
SPACE RECOVERY SYSTEMS, INC., EL SEGUNDO, CALIF.
(SOUNDING ROCKETS, *SPACE CAPSULES, INSTRUMENTATION, AERODYNAMIC CONFIGURATIONS, RE-ENTRY VEHICLES, RE-ENTRY AERODYNAMICS, HYPERSONICS, AERODYNAMIC HEATING, HEAT TRANSFER, DRAG, DECELERATION, PARACHUTES, PARACHUTE DESCENTS, *RECOVERY, MATHEMATICAL ANALYSIS, FEASIBILITY STUDIES.)

***SPACE ENVIRONMENTAL CONDITIONS**

AD-272 767 62-2-4 DIV. 12
NORTH AMERICAN AVIATION, INC., DOWNEY, CALIF.
(SATELLITE VEHICLES, LUNAR PROBES, *SPACESHIPS, *SPACE ENVIRONMENTAL CONDITIONS, CONTROL SYSTEMS FOR ATMOSPHERE, *TEMPERATURE CONTROL, THEORY, DESIGN, MILITARY REQUIREMENTS.) (THERMAL INSULATION, HEAT EXCHANGERS, HEAT TRANSFER, COOLING, RADIATORS, REFRIGERATION SYSTEMS.) (HUMIDITY, PRESSURE, OXYGEN, CARBON DIOXIDE, NITROGEN, HUMAN ENGINEERING OF CLOSED-CYCLE ECOLOGICAL SYSTEMS, SPACESHIP CABINS.) (AUXILIARY POWER PLANTS SATELLITE ATTITUDE.) (MATHEMATICAL ANALYSIS, CONTROL SYSTEMS, INTEGRATION, EFFECTIVENESS, RELIABILITY.)

AD-272 922 62-2-4 DIV. 12
NORTH AMERICAN AVIATION, INC., LOS ANGELES, CALIF.
(*SPACE ENVIRONMENTAL CONDITIONS, CONTROL SYSTEMS FOR MANNED SPACESHIPS, SATELLITE VEHICLES, SPACE FLIGHT.) (DESIGN, *TEMPERATURE CONTROL, ATMOSPHERE, HEAT TRANSFER, HEAT EXCHANGERS, RADIATORS, *WATER, HUMIDITY, OXYGEN, NITROGEN, CARBON DIOXIDE, CONTAMINATION, FOOD, STORAGE, CLOSED CYCLE ECOLOGICAL SYSTEMS, HUMAN ENGINEERING.) (EFFECTIVENESS, RELIABILITY, MATHEMATICAL ANALYSIS, FEASIBILITY STUDIES, HYDROGEN, LIQUID ROCKET PROPELLANTS, COOLANTS, COOLING, REFRIGERATION SYSTEMS.)

***SPACE FLIGHT**

AD-272 581 62-2-4 DIV. 16
NAVAL SCHOOL OF AVIATION MEDICINE, PENSACOLA, FLA.
(*BIBLIOGRAPHY, *ASTRONAUTICS, *SPACE MEDICINE, *SPACE FLIGHT, SPACE CAPSULES, *EIGHTLESSNESS, BALLOONS, MANNED, COSMIC RAYS, MAN, LABORATORY ANIMALS.) SCIENTIFIC RESEARCH.

AD-272 847 62-2-4 DIV. 12
RAND CORP., SANTA MONICA, CALIF.
(*SPACE FLIGHT, SPACE PROBES, LUNAR PROBES, SATELLITE VEHICLES, SPACESHIP, MANNED, USSR.) (*ROCKET MOTORS, STAGING, ROCKET PROPULSION, THRUST, LAUNCHING, STABILIZATION.) (GUIDED MISSILE RESEARCH, *RESEARCH PROGRAM ADMINISTRATION.)

***SPACE MEDICINE**

AD-272 581 62-2-4 DIV. 16
NAVAL SCHOOL OF AVIATION MEDICINE, PENSACOLA, FLA.
(*BIBLIOGRAPHY, *ASTRONAUTICS, *SPACE MEDICINE, *SPACE FLIGHT, SPACE CAPSULES, *EIGHTLESSNESS, BALLOONS, MANNED, COSMIC RAYS, MAN, LABORATORY ANIMALS.) SCIENTIFIC RESEARCH.

***SPACE NAVIGATION**

AD-272 955 62-2-4 DIV. 12
LABORATORIES FOR RESEARCH AND DEVELOPMENT, FRANKLIN INST., PHILADELPHIA, PA.
(*SPACE NAVIGATION, *CELESTIAL NAVIGATION, ELECTROMAGNETIC WAVES, OPTICAL SYSTEMS, DOPPLER SYSTEMS, STARS, LIGHT TRANSMISSION, SPECTROGRAPHIC ANALYSIS.) (*INTERFEROMETERS, TEMPLATES, LIGHT, SOURCES, INTENSITY, SENSITIVITY, TESTS, SIGNAL-TO-NOISE RATIO.)

***SPACE PROBES**

AD-272 831 62-2-4 DIV. 2
ELECTRO-MECHANICS CO., AUSTIN, TEX.
(*MAGNETIC FIELDS, *PLANETARY ATMOSPHERES, INTERSTELLAR MATTER, *SPACE PROBES, SOLAR ATMOSPHERE, SOLAR CORONA, *TERRESTRIAL MAGNETISM, SOLAR NOISE.) (*MAGNETOHYDRODYNAMICS, SHOCK WAVES, PLASMA PHYSICS.) (INSTRUMENTATION, TESTS, RELIABILITY, MAGNETOMETERS, TELEMETER SYSTEMS, COMMUNICATIONS THEORY.) *BIBLIOGRAPHY.

AD-272 859 62-2-4 DIV. 30
AIR FORCE SPECIAL WEAPONS CENTER, KIRTLAND AIR FORCE BASE, N. MEX.
(*PROGRAMMING, *COMPUTERS, *SPACE PROBES, BOOSTER ROCKETS, *ORBITAL FLIGHT PATHS, VELOCITY.) (GEODESICS, *CELESTIAL MECHANICS, TIME, AZIMUTH, CELESTIAL NAVIGATION, PERTURBATION THEORY, GRAVITY.)

***SPACESHIPS**

AD-272 559 62-2-4 DIV. 12
RAND CORP., SANTA MONICA, CALIF.
(*SPACESHIPS, THRUST, *EARTH ORBITS, *MARS, FLIGHT PATHS, PROPULSION, THEORY.) (*CONTROL SYSTEMS, *NON-LINEAR DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS, MATRIX ALGEBRA, VECTOR ANALYSIS, TRANSFORMATIONS (MATHEMATICS), INEQUALITIES.)

AD-272 616 62-2-4 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*SPACESHIPS, RE-ENTRY VEHICLES, LANDING, PNEUMATIC DEVICES, REDUCTION OF IMPACT SHOCK ON SAND, WATER, CONCRETE, MODE TESTS, MATHEMATICAL ANALYSIS.)

AD-272 767 62-2-4 DIV. 12
NORTH AMERICAN AVIATION, INC., DOWNEY, CALIF.
(SATELLITE VEHICLES, LUNAR

PROBES. *SPACESHIPS. *SPACE ENVIRONMENTAL CONDITIONS. CONTROL SYSTEMS FOR ATMOSPHERE. *TEMPERATURE CONTROL. THEORY. DESIGN. MILITARY REQUIREMENTS.) (THERMAL INSULATION. HEAT EXCHANGERS. HEAT TRANSFER. COOLING. RADIATORS. REFRIGERATION SYSTEMS.) (HUMIDITY. PRESSURE. OXYGEN. CARBON DIOXIDE. NITROGEN. HUMAN ENGINEERING OF CLOSED-CYCLE ECOLOGICAL SYSTEMS. SPACESHIP CABINS.) (AUXILIARY POWER PLANTS SATELLITE ATTITUDE.) (MATHEMATICAL ANALYSIS. CONTROL SYSTEMS. INTEGRATION. EFFECTIVENESS. RELIABILITY.)

AD-272 876 62-2-4 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WASHINGTON. D. C.
(*SHIELDING OF CONICAL BODIES. *SPACESHIPS FROM THERMAL RADIATION. *SOLAR ENERGY.) (TEMPERATURE AND HEAT TRANSFER. CONTROL SYSTEMS. THERMAL CONDUCTIVITY OF MATERIALS.) (FUNCTIONS. INTEGRAL EQUATIONS.)

AD-272 902 62-2-4 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WASHINGTON. D. C.
(*LUNAR PROBES. *SPACESHIPS. MANNED. LAUNCHING. SPACE FLIGHT. ORBITAL FLIGHT PATHS. GUIDED MISSILE TRAJECTORIES. EXTERIOR BALLISTICS. TERMINAL BALLISTICS. ATMOSPHERE ENTRY. LANDING. MATHEMATICAL ANALYSIS. MATHEMATICAL PREDICTION.)

***SPARK IGNITION**

AD-272 980 62-2-4 DIV. 10
CALIFORNIA U.. BERKELEY.
(*DETONATION OF *GASES. MIXTURES OF HYDROGEN AND OXYGEN.) (GASES. *SPARK IGNITION. FLAMES. ACCELERATION.) SCHLIEREN PHOTOGRAPHY.

***SPECTROGRAPHIC ANALYSIS**

AD-272 573 62-2-4 DIV. 2
MANCHESTER U. (GT. BRIT.).
(*MOON. MINERALS. LUMINESCENC. *SPECTROGRAPHIC ANALYSIS. POLARIZATION. MEASUREMENT.) (*SPECTROPHOTOMETERS. POLARISCOPS. DESIGN. PHOTOMULTIPLIERS.)

***SPECTROPHOTOMETERS**

AD-272 573 62-2-4 DIV. 2
MANCHESTER U. (GT. BRIT.).
(*MOON. MINERALS. LUMINESCENC. *SPECTROGRAPHIC ANALYSIS. POLARIZATION. MEASUREMENT.) (*SPECTROPHOTOMETERS. POLARISCOPS. DESIGN. PHOTOMULTIPLIERS.)

***SPHERES**

AD-272 577 62-2-4 DIV. 9
NAVAL ORDNANCE TEST STATION. CHINA LAKE. CALIF.
(*SPHERES. *WATER ENTRY. *LOAD DISTRIBUTION.) (HYDRODYNAMICS. DRAG. FLUID FLOW.)

***SPRINGS**

AD-272 989 62-2-4 DIV. 22
FELTMAN RESEARCH LABS.. PICATINNY ARSENAL. DOVER. N. J.
(*NON-DESTRUCTIVE TESTING. *RADIOACTIVE ISOTOPES. GAMMA RAYS. DETECTION. NEUTRON DETECTORS FOR QUALITY CONTROL. WIRE. *SPRINGS. *PROJECTILE FUZES. *FUZES.)

***SPRUE**

AD-272 529 62-2-4 DIV. 16
BIRMINGHAM U. (GT. BRIT.).
(*PROTEINS. *LABELED SUBSTANCES. DIET. METABOLISM.) (*SPRUE. BIOCHEMISTRY. ABSORPTION. METABOLIC PRODUCTS. DEFICIENCY DISEASES.)

***STAINLESS STEEL**

AD-272 779 62-2-4 DIV. 17
SOUTHERN RESEARCH INST.. BIRMINGHAM. ALA.
(*STAINLESS STEEL. HEATING. HIGH TEMPERATURE RESEARCH. LOADING. THERMODYNAMICS.) (*NIOBIUM. *TANTALUM. AGING. DEFORMATION. ELASTICITY. FRACTURE (MECHANICS).) (*SHEETS. HEAT TREATMENT. STRESSES. TENSILE PROPERTIES. MECHANICAL PROPERTIES. FAILURE (MECHANICS). THEORY. MATHEMATICAL ANALYSIS. TEST METHODS.) (AIRCRAFT. MATERIALS. REFRACTORY MATERIALS.)

***STEEL**

AD-272 656 62-2-4 DIV. 20
MASSACHUSETTS INST. OF TECH.. DIV. OF SPONSORED RESEARCH. CAMBRIDGE.
(*ROCKET CASES. *WELDING. *STEEL. SHEETS. PROCESSING. MANUFACTURING METHODS.) (ARC WELDING BY ELECTRODES. TUNGSTEN. GASES. SHIELDING VS ELECTRON BEAMS. WELDS. MECHANICAL PROPERTIES. FRACTURE (MECHANICS). HARDENING. EFFECTIVENESS. HEAT TREATMENT.)

AD-272 686 62-2-4 DIV. 17
BATTELLE MEMORIAL INST.. COLUMBUS. OHIO.
(METALS. *STEEL. WELDING. ARC WELDING. ELECTRON BEAMS. METAL JOINTS. *WELDS. *WELDED JOINTS. HEAT TREATMENT.) (TESTS. MECHANICAL PROPERTIES. TENSILE PROPERTIES. DEFORMATION. FRACTURE (MECHANICS). MICROSTRUCTURE. METALLURGICAL ANALYSIS. MICROPHOTOGRAPHY. GRAINS (METALLURGY). MICROSCOPY. X RAYS.) ROCKET CASES.

AD-272 799 62-2-4 DIV. 17
LYON. INC.. DETROIT. MICH.
(*DRAWING (MACHINE PROCESSING). *ROCKET CASES. AUSTENITE. *STEEL.) (PROCESSING. MANUFACTURING METHODS. ROCKET MOTORS. COMBUSTION CHAMBERS. HEAT TREATMENT. DEFORMATION. PLASTIC FLOW. PLASTICITY. HARDENING. TEMPERATURE. MECHANICAL PROPERTIES. TENSILE PROPERTIES.) (TOOLS. DIES. DESIGN.)

***STEREOCHEMISTRY**

AD-272 594 62-2-4 DIV. 4
MONOMER-POLYMER. GORDEN CO.. PHILADELPHIA. PA.
(*POLYMERS. *POLYMERIZATION. *STYRENES. *ETHYLENES. STEREOCHEMISTRY.) (SYNTHESIS. STYRENES. FLUORIDES. FLUORINATION. NITRATION. HALOGENATION. SOLUBILITY.) (MOLECULAR STRUCTURE. CHEMICAL REACTIONS. CHEMICAL WARFARE AGENTS. G AGENTS.) (CATALYSIS. CATALYSTS. METALORGANIC COMPOUNDS.)

***STORAGE**

AD-272 990 62-2-4 DIV. 22
FRANKFORD ARSENAL. PHILADELPHIA. PA.
(ORDNANCE. *STORAGE. HUMIDITY. DETERIORATION. TESTS. *HOWITZERS. *RECOIL MECHANISMS. CORROSION.)

***STORAGE TUBES**

AD-272 995 62-2-4 DIV. 8
ITT FEDERAL LABS.. FORT WAYNE. IND.
(*PRODUCTION. ENGINEERING. ANALYSIS FOR PRODUCTION OF *STORAGE TUBES.

***STRESSES**

AD-272 549 62-2-4 DIV. 25
ILLINOIS INST. OF TECH.. CHICAGO.
(*CYLINDRICAL BODIES. *ROTATING STRUCTURES. ROTATION. *STRESSES. *ELASTICITY. PLASTICITY.) (STRESSES. MATHEMATICAL ANALYSIS.)

AD-272 619 62-2-4 DIV. 22
ORDNANCE MISSION. WHITE SANDS MISSILE RANGE. N. MEX.
(SIMULATION OF *STRESSES. ANALYSIS ON *ROCKET LAUNCHERS DURING TRANSPORTATION OVER ROADS.) (ROCKET LAUNCHERS. STRUCTURES. *COATINGS. FATIGUE (MECHANICS). STRAIN GAGES. CALIBRATION. TESTS.) ROCKETS. SURFACE TO SURFACE.

AD-272 649 62-2-4 DIV. 25
BROWN U. DIV. OF APPLIED MATHEMATICS. PROVIDENCE. R. I.
(*STRESSES ON *STRUCTURAL SHELS UNDER LOADING AND *LOAD DISTRIBUTION. MECHANICS. SHEAR STRESSES.) (TENSOR ANALYSIS. FUNCTIONS. PARTIAL DIFFERENTIAL EQUATIONS. POLYNOMIALS. LINEAR SYSTEMS.)

***STRUCTURAL SHELLS**

AD-272 550 62-2-4 DIV. 25
ILLINOIS INST. OF TECH.. CHICAGO.
(*LOAD DISTRIBUTION. LOADING F *STRUCTURAL SHELLS. PLASTICS. STRESSES. *PLASTIC FLOW.) (STRESSES. MATHEMATICAL ANALYSIS.)

AD-272 551 62-2-4 DIV. 25
ILLINOIS INST. OF TECH.. CHICAGO.
(*LOAD DISTRIBUTION AND LOADING OF *STRUCTURAL SHELLS. ELASTICITY. STRESSES. *CONICAL BODIES. BODIES OF REVOLUTION. PLASTICS.) (STRESSES. MATHEMATICAL ANALYSIS.)

AD-272 649 62-2-4 DIV. 25
BROWN U. DIV. OF APPLIED MATHEMATICS. PROVIDENCE. R. I.
(*STRESSES ON *STRUCTURAL SHELS UNDER LOADING AND *LOAD DISTRIBUTION. MECHANICS. SHEAR STRESSES.) (TENSOR ANALYSIS. FUNCTIONS. PARTIAL DIFFERENTIAL EQUATIONS. POLYNOMIALS. LINEAR SYSTEMS.)

AD-272 956 62-2-4 DIV. 25
ILLINOIS U.. URBANA.
(*LOAD DISTRIBUTION. LOADING OF HEMISPHERICAL SHELLS AND *STRUCTURAL SHELLS BY *BLAST AND SHOCK WAVES.) (STRESSES. ELASTICITY. MATHEMATICAL ANALYSIS.)

***STYRENES**

AD-272 594 62-2-4 DIV. 4
MONOMER-POLYMER. GORDEN CO.. PHILADELPHIA. PA.
(*POLYMERS. *POLYMERIZATION. *STYRENES. *ETHYLENES. STEREOCHEMISTRY.) (SYNTHESIS. STYRENES. FLUORIDES. FLUORINATION. NITRATION. HALOGENATION. SOLUBILITY.) (MOLECULAR STRUCTURE. CHEMICAL REACTIONS. CHEMICAL WARFARE AGENTS. G AGENTS.) (CATALYSIS. CATALYSTS. METALORGANIC COMPOUNDS.)

***SUBMARINES**

AD-272 913 62-2-4 DIV. 31
ELECTRIC BOAT DIV.. GENERAL DYNAMICS CORP.. GROTON. CONN.
(CONTROL. *CONTROL SYSTEMS IN *SUBMARINES CARRYING UNDERWATER TO SURFACE GUIDED MISSILES.) (SHIPBORNE. DATA PROCESSNG SYSTEMS. DIGITAL SYSTEMS.) (REDUCTION OF COSTS BY REDUCTION OF SUBMARINE PERSONNEL.) *DISPLAY SYSTEMS. *COMBAT INFORMATION CENTERS. CONTROL PANELS. SHIPBORNE. HUMAN ENGINEERING.

***SULFIDES**

AD-272 786 62-2-4 DIV. 25
WESTINGHOUSE ELECTRIC CORP.. BLOOMFIELD. N. J.
(LUMINESCENCE. *LUMINESCENT MATERIALS. LUMINESCENT PIGMENTS. *PHOSPHORS. *CRYSTAL PHOSPHORS. COLORS.) (*COMPLEX COMPOUNDS. *ZINC COMPOUNDS. *SULFIDES AND COPPER COMPOUNDS. THALLIUM COMPOUNDS. LITHIUM COMPOUNDS. IRON COMPOUNDS. IODIDES. CADMIUM COMPOUNDS. ALUMINUM COMPOUNDS. MERCURY COMPOUNDS. OXYGEN COMPOUNDS.) (PHOTOEMISSION. EXCITATION.) (DIELECTRICS. PLASTICS. IMPREGNATION. PHOSPHORS.)

***SUPERAERODYNAMICS**

AD-272 540 62-2-4 DIV. 25
FOREIGN TECH. DIV.. AIR FORCE SYSTEMS COMMAND. WRIGHT-PATTERSON AIR FORCE BASE. OHIO.
(*SUPERAERODYNAMICS. GAS FLOW. *LOW PRESSURE RESEARCH. THERMAL CONDUCTIVITY. CONVECTION. TRANSPORT PROPERTIES. *THERMAL DIFFUSION. *HEAT TRANSFER. KINETIC THEORY.) USSR.

***SUPERCONDUCTIVITY**

AD-272 837 62-2-4 DIV. 25
AVCO RESEARCH LAB.. EVERETT. MASS.
(TESTS AND DESIGN OF *MAGNETOHYDRODYNAMICS. *GENERATORS. COILS. MAGNETIC FIELDS.) (TEMPERATURE. CRYOGENICS. *SUPERCONDUCTIVITY. COOLING.) (HEAT TRANSFER. CONDUCTIVITY.) INTEGRAL EQUATIONS.

***SUPERSONIC FLOW**

AD-272 641 62-2-4 DIV. 9
ARMY ORDNANCE MISSILE COMMAND (REDSTONE ARSENAL. HUNTSVILLE. ALA.)
(NUMERICAL ANALYSIS FOR DETERMINATION OF *SUPERSONIC FLOW AROUND *BLUNT BODIES WITH SUPERSONIC FLOW AT CHEMICAL EQUILIBRIUM.)

AD-272 990 62-2-4 DIV. 9
GRUMMAN AIRCRAFT ENGINEERING CORP.. BETHPAGE. N. Y.
(GAS FLOW. *SUPERSONIC FLOW IN *CONICAL BODIES. *SHOCK WAVES. VELOCITY. MACH NUMBER. ANGLE-OF-ATTACK INDICATORS.) (FUNCTIONS. PARTIAL DIFFERENTIAL EQUATIONS. POLYNOMIALS. NONLINEAR SYSTEMS.) USSR.

***SWEPT-BACK WINGS**

AD-272 615 62-2-4 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION WASHINGTON. D. C.
(*SWEPT-BACK WINGS. SWEPT WINGS. ENGINE NACELLES. AERODYNAMICS. TRANSONICS. *FLUTTER. MODEL TESTS. WIND TUNNEL MODELS.) (SUPERSONIC PLANES. TRANSPORT PLANES.)

***SYMPOSIA**

AD-272 762 62-2-4 DIV. 26
ARMED FORCES-NRC VISION COMMITTEE. WASHINGTON. D. C.
(*SYMPOSIA. ARMED FORCES. *VISION. *VISUAL PERCEPTION. SPACE PERCEPTION. VISUAL THRESHOLDS. STEREOSCOPIC VISION. PHOTOGRAPHIC ANALYSIS. AERIAL RECONNAISSANC. DARK ADAPTATION.) ASTRONAUTICS. WARFARE.

***SYNTHETIC FIBERS**

AD-272 560 62-2-4 DIV. 27
AEROJET-GENERAL CORP.. AZUSA. CALIF.
(*ROCKET CASES. *FILAMENT WOUND CONSTRUCTION. MATERIALS. FIBERS. *SYNTHETIC FIBERS. FILAMENTS. GLASS TEXTILES. IMPREGNATION. COATINGS. RESINS. HEAT RESISTANT

POLYMERS.) HIGH PRESSURE RESEARCH, HIGH TEMPERATURE RESEARCH, TENSILE PROPERTIES, FAILURE (MECHANICS), TESTS.

AD-272 592 62-2-4 DIV. 14
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS.,
ARMY CHEMICAL CENTER, MD.
(+MATERIALS, +ORGANIC MATERIAS, +CERAMIC MATERIALS, INORGANIC SUBSTANCES, +FIBERS, PRODUCTION, SYNTHESIS, MANUFACTURING METHODS.) (METALORGANIC COMPOUNDS, +POLYMER, +PLASTICS, HEAT RESISTANT POLYMERS, RESINS, LAMINATES, COATINGS, ADHESIVES.) (+SYNTHETIC FIBERS, TEXTILES.) (METALS, ALLOYS.) (TOXICITY, HAZARDS.) (RADIATION EFFECTS, SPACE ENVIRONMENTAL CONDITIONS, GUIDED MISSILES.) SOLID ROCKET PROPELLANTS, +BIBLIOGRAPHY.

AD-272 630 62-2-4 DIV. 14
ROCKETDYNE, CANOGA PARK, CALIF.
(+ROCKET CASES, PROPELLANT TANKS, CYLINDRICAL BODIES, +FILAMENT WOUND CONSTRUCTION, MANUFACTURING METHODS, PROCESSING.) (FIBERS, +SYNTHETIC FIBERS, +GLASS TEXTILES, IMPREGNATION, RESINS, EPOXY RESINS, LAMINATS.) (TESTS, PRESSURE, TENSILE PROPERTIES.) WIRE +WINDING MACHINES.

***TABLES**

AD-272 345 62-2-4 DIV. 25
ARNOLD ENGINEERING DEVELOPMENT CENTER, ARNOLD AIR FORCE STATION, TENN.
(HANDBOOKS OF *PHYSICAL PROPERTIES, MEASUREMENT.) *TABLES, *BIBLIOGRAPHY

AD-272 634 62-2-4 DIV. 2
GEOPHYSICAL INST., U. OF ALASKA, COLLEGE.
(*GEOPHYSICS, EARTH, ELECTRIC CURRENT, TERRESTRIAL MAGNETISM, *IONOSPHERE, COSMIC RAYS, EXTRATERRESTRIAL RADIO WAVES, AURORAE.) (DATA, *TABLES.) (*ARCTIC REGIONS ALASKA.)

AD-272 918 62-2-4 DIV. 20
GENERAL DYNAMICS/FORT WORTH, TEX.
(*ELASTIC SCATTERING AND *TRANSPORT PROPERTIES OF NUCLEAR REACTIONS IN WATER.) (SHIELDING, NEUTRONS, *NEUTRON FLUX DENSITY, NUCLEI, FISSION, NUCLEAR ENERGY.) (DIFFERENTIAL CROSS SECTION, DIFFERENTIAL GEOMETRY, OPERATORS (MATHEMATICS), POLYNOMIALS, FUNCTIONS.) *TABLES.

***TANTALUM**

AD-272 779 62-2-4 DIV. 17
SOUTHERN RESEARCH INST., BIRMINGHAM, ALA.
(*STAINLESS STEEL, *ALLOYS, HIGH TEMPERATURE RESEARCH, LOADING, THERMODYNAMICS.) (*NIOBIUM, *TANTALUM, AGING, DEFORMATION, ELASTICITY, FRACTURE (MECHANICS).) (*SHEETS, HEAT TREATMENT, STRESSES, TENSILE PROPERTIES, MECHANICAL PROPERTIES, FAILURE (MECHANICS), THEORY, MATHEMATICAL ANALYSIS, TEST METHODS.) (AIRCRAFT, MATERIALS, REFRACTORY MATERIALS.)

***TARGET DRONES**

AD-272 903 62-2-4 DIV. 1
RADIOPLANE DIV., NORTHROP CORP., HAWTHORNE, CALIF.
(*TARGET DRONES FOR INTERCEPTION BY GUIDED MISSILES, SURFACE TO AIR, SOLID ROCKET PROPELLANTS.) (FLIGHT TESTING RELIABILITY, EFFECTIVENESS, RECOVERY, TESTS.)

***TARGET RECOGNITION**

AD-272 939 62-2-4 DIV. 6
ADVANCED ELECTRONICS CENTER, GENERAL ELECTRIC CO., ITHACA, N. Y.
(*TARGET RECOGNITION, *OPERATIONS RESEARCH, *DETECTION, FEASIBILITY STUDIES.) (SEQUENTIAL ANALYSIS, STATISTICAL PREDICTION, LINEAR SYSTEMS.) COMPUTERS, ANALYSIS, STATISTICAL TESTS, MATHEMATICAL

***TELEMETER SYSTEMS**

AD-272 304 62-2-4 DIV. 9
RADIATION, INC., MELBOURNE, FLA.
(*HANDBOOKS, *TELEMETER SYSTEMS, *TRANSDUCERS, PARTS CATALOGS.) BIBLIOGRAPHY, INDEXES.

AD-272 875 62-2-4 DIV. 7
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*TIME SWITCHES, *COMMUTATORS FOR *TELEMETER SYSTEMS IN *SATELLITE VEHICLES.

***TEMPERATURE**

AD-272 948 62-2-4 DIV. 25
AEROSPACE CORP., LOS ANGELES, CALIF.
(*MEASUREMENT OF *TEMPERATURE IN *GASES, HIGH TEMPERATURE RESEARCH, *GAS IONIZATION.) (FUNCTIONS, POTENTIAL THEORY.)

***TEMPERATURE CONTROL**

AD-272 767 62-2-4 DIV. 12
NORTH AMERICAN AVIATION, INC., DOWNEY, CALIF.
(SATELLITE VEHICLES, LUNAR PROBES, *SPACESHIPS, *SPACE ENVIRONMENTAL CONDITIONS, CONTROL SYSTEMS FOR ATMOSPHERE, *TEMPERATURE CONTROL, THEORY, DESIGN, MILITARY REQUIREMENTS.) (THERMAL INSULATION, HEAT EXCHANGERS, HEAT TRANSFER, COOLING, RADIATORS, REFRIGERATION SYSTEMS.) (HUMIDITY, PRESSURE, OXYGEN, CARBON DIOXIDE, NITROGEN, HUMAN ENGINEERING OF CLOSED-CYCLE ECOLOGICAL SYSTEMS, SPACESHIP CABINS.) (AUXILIARY POWER PLANTS, SATELLITE ATTITUDE.) (MATHEMATICAL ANALYSIS, CONTROL SYSTEMS, INTEGRATION, EFFECTIVENESS, RELIABILITY.)

AD-272 922 62-2-4 DIV. 12
NORTH AMERICAN AVIATION, INC., LOS ANGELES, CALIF.
(*SPACE ENVIRONMENTAL CONDITIONS, CONTROL SYSTEMS FOR MANNED, SPACESHIPS, SATELLITE VEHICLES, SPACE FLIGHT.) (DESIGN, *TEMPERATURE CONTROL, ATMOSPHERE, HEAT TRANSFER, HEAT EXCHANGERS, RADIATORS, WATER, HUMIDITY, OXYGEN, NITROGEN, CARBON DIOXIDE, CONTAMINATION, FOOD, STORAGE, CLOSED CYCLE ECOLOGICAL SYSTEMS, HUMAN ENGINEERING.) (EFFECTIVENESS, RELIABILITY, MATHEMATICAL ANALYSIS, FEASIBILITY STUDIES, HYDROGEN, LIQUID ROCKET PROPELLANTS, COOLANTS COOLING, REFRIGERATION SYSTEMS.)

***TEMPERATURE WARNING SYSTEMS**

AD-272 973 62-2-4 DIV. 22
MEASUREMENT SYSTEMS, INC., NORWALK, CONN.
(*ELECTRIC IGNITERS, *ELECTRIC DETONATORS, ELECTRIC BRIDGES, TEMPERATURE DETERMINATION, ELECTRIC FIRE, ELECTROMAGNETIC EFFECTS, HAZARDS, *TEMPERATURE WARNING SYSTEMS, DETECTORS, OPTICAL EQUIPMENT, DESIGN.)

***TERMINAL BALLISTICS**

AD-272 947 62-2-4 DIV. 25
AMERICAN MACHINE AND FOUNDRY CO., NILES, ILL.
(*SOLID STATE PHYSICS, *TERMINAL BALLISTICS, *PENETRATION, *METAL PLATES, ARMOR PLATE, BODY ARMOR, PROJECTILES, IMPACT SHOCK, COMPRESSION SHOCK, SHOCK WAVES, ENERGY, MOTION THEORY.) (THERMODYNAMICS, THERMAL STRESSES, IRREVERSIBLE PROCESSES, RELAXATION TIME.) MECHANICS, CONTINUUM MECHANICS, FRACTURE (MECHANICS), FATIGUE (MECHANICS), FAILURE (MECHANICS), PHYSICAL PROPERTIES, ELASTICITY, PLASTICITY, PLASTIC FLOW, STRESSES, DEFORMATION, LATTICES, EQUATIONS OF STATE, MATHEMATICAL ANALYSIS.

***TERRAIN**

AD-272 665 62-2-4 DIV. 2
ARCTIC INST. OF NORTH AMERICA, WASHINGTON, D.C.
(*TERRAIN, ANALYSIS OF *ARCTIC REGIONS.) (ENGINEERING, PHYSICAL PROPERTIES OF *ICE.) (*RESEARCH PROGRAM ADMINISTRATION IN OCEANOGRAPHY, METEOROLOGY, GEOLOGY, THERMAL RADIATION, MARINE BIOLOGY, GLACIERS AND GEOPHYSICS.) *BIBLIOGRAPHY.

***TERRESTRIAL MAGNETISM**

AD-272 831 62-2-4 DIV. 2
ELECTRO-MECHANICS CO., AUSTIN, TEX.
(*MAGNETIC FIELDS, *PLANETARY ATMOSPHERES, INTERSTELLAR MATTER, *SPACE PROBES, SOLAR ATMOSPHERE, SOLAR CORONA, *TERRESTRIAL MAGNETISM, SOLAR NOISE.) (*MAGNETOHYDRODYNAMICS, SHOCK WAVES, PLASMA PHYSICS.) (INSTRUMENTATION, TESTS, RELIABILITY, MAGNETOMETERS, TELEMETER SYSTEMS, COMMUNICATIONS THEORY.) *BIBLIOGRAPHY.

***TEST FACILITIES**

AD-272 845 62-2-4 DIV. 18
PLANNING RESEARCH CORP., LOS ANGELES, CALIF.
(*MILITARY OPERATIONS, *AIR FORCE OPERATIONS, DISPLAY SYSTEMS, DATA PROCESSING SYSTEMS, COMMAND SYSTEMS, CONTROL SYSTEMS, *WARFARE, SIMULATION, *TEST FACILITIES, LABORATORY EQUIPMENT, HUMAN ENGINEERING, COSTS, *OPERATIONS RESEARCH.)

***THERMAL CONDUCTIVITY**

AD-272 868 62-2-4 DIV. 25
APPLIED PHYSICS LAB., JOHNS HOPKINS U., SILVER SPRING, MD.
(*NITROGEN, *CARBON DIOXIDE, MIXTURES, GASES, HIGH TEMPERATURE RESEARCH, *THERMAL CONDUCTIVITY, THERMODYNAMICS, GAS FLOW, THEORY, TEST METHODS.)

***THERMAL DIFFUSION**

AD-272 340 62-2-4 DIV. 25
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*SUPERAERODYNAMICS, GAS FLOW, *LOW PRESSURE RESEARCH, THERMAL CONDUCTIVITY, CONVECTION, TRANSPORT PROPERTIES, *THERMAL DIFFUSION, *HEAT TRANSFER, KINETIC THEORY.) USSR.

***THERMAL RADIATION**

AD-272 801 62-2-4 DIV. 30
RANDOLPH-MACON COLL., ASHLAND, VA.
(*ELECTROMAGNETIC FIELDS, *HAZARDS, ORDNANCE,* (*OPTICAL INSTRUMENTS, *DETECTORS, *THERMAL RADIATION,) (ELECTRIC DETONATORS, ELECTRIC IGNITERS, THERMAL RADIATION, MEASUREMENT.) (DIAPHRAGMS (MECHANICS), TESTS, TEST EQUIPMENT, MATERIALS, PNEUMATIC DEVICES.) (GLASS TEXTILES, OPTICS.)

***THERMIONIC EMISSION**

AD-272 657 62-2-4 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
(*MAGNETOHYDRODYNAMICS, PLASMA PHYSICS, FLUID FLOW, CONTINUUM MECHANICS, THERMAL CONDUCTIVITY, VISCOSITY,) (*SHOCK WAVES, *WAVE TRANSMISSION, *THERMIONIC EMISSION, *FUEL CELLS, PARAMETRIC AMPLIFIERS.)

AD-272 752 62-2-4 DIV. 7
GENERAL ATOMIC DIV., GENERAL DYNAMICS CORP., SAN DIEGO, CALIF.
(*POWER SUPPLIES FROM *THERMIONIC EMISSION, *CESIUM VAPORS,) (CATHODES, URANIUM COMPOUNDS, ZIRCONIUM COMPOUNDS, CARBIDES, ANODES, COPPER,) (TEMPERATURE, MEASUREMENT, IONS, ELECTRICITY, PRODUCTION,) THEORY, DESIGN, DIODES, THERMOELECTRICITY.

AD-272 753 62-2-4 DIV. 7
GENERAL ATOMIC DIV., GENERAL DYNAMICS CORP., SAN DIEGO, CALIF.
(*ELECTRIC POWER PRODUCTION, *POWER SUPPLIES, THERMIONIC EMISSION, DESIGN, MANUFACTURING METHODS,) (*THERMIONIC EMISSION WITH URANIUM COMPOUNDS AND CARBIDES, ZIRCONIUM COMPOUNDS,) (POWER SUPPLIES FOR POWER REACTORS FOR SPACE FLIGHT,) VACUUM SYSTEMS.

AD-272 775 62-2-4 DIV. 6
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
(*SEMICONDUCTORS, *THERMIONIC EMISSION, *PHOTOEMISSION, FIELD EMISSION, SURFACE PROPERTIES, CONDUCTIVITY, CRYSTAL STRUCTURE, LUMINESCENCE, MEASUREMENT,) (CRYSTALS, SILICON, CESIUM, TUNGSTEN, ARGON, DIFFUSION, SURFACES, THICKNESS, PROCESSING, PREPARATION,)

AD-272 849 62-2-4 DIV. 8
*ESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
(*THERMOELECTRICITY, ELECTRIC POWER PRODUCTION, POWER SUPPLIES,) (ELECTRICAL PROPERTIES, MOLYBDENUM, CESIUM, *DIODES,) (*THERMIONIC EMISSION, *PLASMA PHYSICS, CESIUM, DISCHARGE TUBES,) (THERMIONIC EMISSION, MOLYBDENUM, CATHODES (ELECTRON TUBES), EVAPORATION IN CESIUM, VAPORS,) (ELECTRONS, REFLECTION FROM CESIUM, COATINGS, THIN FILMS,) (CESIUM, VAPORS, THERMAL CONDUCTIVITY,)

***THERMODYNAMICS**

AD-272 533 62-2-4 DIV. 25
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*THERMODYNAMICS, *CERMETS, *REFRACTORY MATERIALS, HIGH TEMPERATURE RESEARCH,) (MEASUREMENT, THERMAL DIFFUSION, HEAT TRANSFER, THERMAL CONDUCTIVITY, SPECIFIC HEAT, RINGS, *EDGES, CYLINDRICAL BODIES,) (GALVANOMETERS, OPTICAL INSTRUMENTS, PYROMETERS,) PHYSICAL PROPERTIES.

AD-272 639 62-2-4 DIV. 17
BIRMINGHAM U. (GT. BRIT.).
(ALLOYS, *TIN ALLOYS, *LIQUID METALS, PHASE STUDIES, PHASE TRANSITIONS, ENTHALPY, *THERMODYNAMICS, *CALORIMETERS, LABORATORY EQUIPMENT, DESIGN,) GREAT BRITAIN.

AD-272 835 62-2-4 DIV. 25
CINCINNATI U., OHIO.
(*CERAMIC MATERIALS, *REFRACTORY MATERIALS, *THERMODYNAMICS, HIGH TEMPERATURE RESEARCH, CRYSTALS, LATTICES,) (ELECTROLYTIC CELLS, IRON COMPOUNDS, OXIDES, ELECTRIC POTENTIAL,) (*CHROMIUM COMPOUNDS AND *ZIRCONIUM COMPOUNDS, *OXIDES,) (CHROMIUM ALLOYS, NICKEL ALLOYS,) (THEORY, *PHASE STUDIES, X-RAY DIFFRACTION ANALYSIS, METALLURGICAL ANALYSIS,)

***THERMOELECTRICITY**

AD-272 849 62-2-4 DIV. 8
*ESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
(*THERMOELECTRICITY, ELECTRIC POWER PRODUCTION, POWER SUPPLIES,) (ELECTRICAL PROPERTIES, MOLYBDENUM, CESIUM, *DIODES,) (*THERMIONIC EMISSION, *PLASMA PHYSICS, CESIUM, DISCHARGE TUBES,) (THERMIONIC EMISSION, MOLYBDENUM, CATHODES (ELECTRON TUBES), EVAPORATION IN CESIUM, VAPORS,) (ELECTRONS, REFLECTION FROM CESIUM, COATINGS, THIN FILMS,) (CESIUM, VAPORS, THERMAL CONDUCTIVITY,)

***THIN FILMS**

AD-272 673 62-2-4 DIV. 9
AERONAUTICAL ELECTRONIC AND ELECTRICAL LAB., NAVAL AIR DEVELOPMENT CENTER, JOHNSVILLE, PA.
(MEMORY DEVICES, *MAGNETIC TAPE, *THIN FILMS,) (*METAL FILMS, MAGNETIC PROPERTIES,)

AD-272 928 62-2-4 DIV. 25
SERVOMECHANISMS, INC., GOLETA, CALIF.
(*THIN FILMS, *DIELECTRIC FILMS, METAL FILMS, MAGNETIC MATERIALS, MATERIALS, MANUFACTURING METHODS, METALLIC SMOKE DEPOSITS, NICKEL ALLOYS, IRON ALLOYS, COBALT ALLOYS, SURFACES, GLASS, PHYSICAL PROPERTIES, MAGNETIC PROPERTIES,) SOLID STATE PHYSICS.

AD-272 929 62-2-4 DIV. 25
SERVOMECHANISMS, INC., GOLETA, CALIF.
(*THIN FILMS, *DIELECTRIC FILMS, MAGNETIC MATERIALS, *LUMINESCENT MATERIALS, LUMINOUS PIGMENTS, *PHOSPHORS, MATERIALS, ME-

TALLIC SMOKE DEPOSITS. ZINC COMPOUNDS. SULFIDES. CATALYSTS. POWDER METALS. MANGANESE. SURFACES. GLASS. PHOTOEMISSION. EXCITATION. ELECTRICITY.) MANUFACTURING METHODS. VACUUM APPARATUS.

***THRUST BEARINGS**

AD-272 999 62-2-4 DIV. 20
LABORATORIES FOR RESEARCH AND DEVELOPMENT. FRANKLIN INST., PHILADELPHIA, PA.
(*THRUST BEARINGS. *GAS BEARINGS. LUBRICATION. PRESSURE. STABILITY. OSCILLATION. PERTURBATION THEORY. TESTS. MEASUREMENT.)

***TIME SWITCHES**

AD-272 975 62-2-4 DIV. 7
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. *WASHINGTON, D. C.
(*TIME SWITCHES. *COMMUTATORS FOR *TELEMETER SYSTEMS IN *SATELLITE VEHICLES.

***TIN ALLOYS**

AD-272 639 62-2-4 DIV. 17
BIRMINGHAM U. (GT. BRIT.).
(ALLOYS. *TIN ALLOYS. *LIQUID METALS. PHASE STUDIES. PHASE TRANSITIONS. ENTHALPY. *THERMODYNAMICS. *CALORIMETERS. LABORATORY EQUIPMENT. DESIGN.) *HEAT CAPACITY.

***TITANATES**

AD-272 761 62-2-4 DIV. 14
NEW YORK U. COLL. OF ENGINEERING, N. Y.
(*HEAT RESISTANT POLYMERS. POLYMERS. *METALORGANIC COMPOUNDS. RESINS. *EPOXY RESINS. *COATINGS. PIGMENTS. ADDITIVES. SYNTHESIS. HIGH TEMPERATURE RESEARCH. STABILITY. PYROLYSIS. DETERIORATION.) (COMPLEX COMPOUNDS. PROPYL RADICALS. *TITANATES. VINYL RADICALS. CYCLOHEXENES. DIOXIDES. TITANIUM COMPOUNDS. ZINC COMPOUNDS. ALUMINUM COMPOUNDS. SILICONES.) (STEEL. PLASTIC COATINGS.)

***TITANIUM**

AD-272 909 62-2-4 DIV. 20
UNITED NUCLEAR CORP., *WHITE PLAINS, N. Y.
(*NEUTRON CROSS SECTIONS. *TITANIUM. *POTASSIUM. *MAGNESIUM. *NITROGEN. ALUMINUM. SILICON. SODIUM. OXYGEN.) (NEUTRONS. SCATTERING. GAMMA RAYS.) TABLES.

***TOOLS**

AD-272 602 62-2-4 DIV. 26
BOEING CO., SEATTLE, WASH.
(DESIGN. STANDARDIZATION. *INDUSTRIAL EQUIPMENT. *JIGS. TOOLS.) (*TOOLS. AIRFRAMES. AIRCRAFT INDUSTRY.) INDUSTRIAL PRODUCTION. INSTRUCTION MANUALS. SPECIFICATIONS.

AD-272 603 62-2-4 DIV. 26
BOEING CO., SEATTLE, WASH.
(DESIGN. STANDARDIZATION. *INDUSTRIAL EQUIPMENT. *JIGS. TOOLS.) (*TOOLS. AIRFRAMES. AIRCRAFT INDUSTRY.) (INDUSTRIAL PRODUCTION. INSTRUCTION MANUALS. SPECIFICATIONS.)

***TORSION BALANCES**

AD-272 987 62-2-4 DIV. 30
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(DESIGN OF *VACUUM SYSTEMS. *TORSION BALANCES. QUARTZ. FIRE. ELASTICITY. MAGNETS. COILS.) (*INSTRUMENTATION. MEASUREMENT.)

***TOWED BODIES**

AD-272 587 62-2-4 DIV. 31
WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
(*TRANSDUCERS. *TOWED BODIES. *CONTAINERS. HOUSING. PACKAGING. TOWING CABLES. HOISTS. SHIPBORNE. LOAD DISTRIBUTION. STABILITY. DESIGN. TESTS.) ECHO RANGING. *SONAR EQUIPMENT.

***TRACKING**

AD-272 957 62-2-4 DIV. 5
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(*COMMAND SYSTEMS. ANALYSIS. COMMUNICATION SYSTEMS.) (SATELLITE VEHICLES. *TRACKING.) (*DIGITAL COMPUTERS. *MATHEMATICAL LOGIC. DATA TRANSMISSION SYSTEMS. MASERS. OPTICS. SOLID STATE PHYSICS. IMAGE CONVERTER TUBES.)

AD-272 971 62-2-4 DIV. 12
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
(INTERFEROMETERS. DIRECTION FINDING. ANTENNAS. DOPPLER SYSTEMS FOR *TRACKING. *SATELLITE VEHICLES.) (RADIO-FREQUENCY FILTERS FOR *DOPPLER TRACKING OF SATELLITE VEHICLES.) SATELLITE VEHICLE TRAJECTORIES. ORBITAL FLIGHT PATHS.

***TRANSDUCERS**

AD-272 506 62-2-4 DIV. 6
RAYTHEON, INC., MELBOURNE, FLA.
(*HANDBOOKS. *TELEMETER SYSTEMS. *TRANSDUCERS. PARTS CATALOGS.) BIBLIOGRAPHY. INDEXES.

AD-272 532 62-2-4 DIV. 25
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, *WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*HEAT TRANSFER. THERMAL CONDUCTIVITY OF *GAS FLOW. SHOCK WAVES IN *SHOCK TUBES. PLASMA PHYSICS. ELECTRIC DISCHARGES.) (*TRANSDUCERS. THIN FILMS. GLASS. DIELECTRICS. PLATINUM.) USSR.

AD-272 587 62-2-4 DIV. 31
*WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
(*TRANSDUCERS. *TOWED BODIES. *CONTAINERS. HOUSING. PACKAGING. TOWING CABLES. HOISTS. SHIPBORNE. LOAD DISTRIBUTION. STABILITY. DESIGN. TESTS.) ECHO RANGING. *SONAR EQUIPMENT.

***TRANSISTORS**

AD-272 633 62-2-4 DIV. 8
MOTOROLA, INC., PHOENIX, ARIZ.
(*TRANSISTORS. MICROWAVE EQUIPMENT. RADIOFREQUENCY POWER. ULTRA HIGH FREQUENCY. PRODUCTION. *MANUFACTURING METHODS. MILITARY REQUIREMENTS. PROCESSING. SPECIFICATIONS.) (TRANSISTORS. SEMICONDUCTORS. GERMANIUM. LIFE EXPECTANCY. PACKAGED CIRCUITS. DESIGN.)

AD-272 678 62-2-4 DIV. 8
PACIFIC SEMICONDUCTORS, INC., LAWNDALE, CALIF.
(*PRODUCTION. ENGINEERING. ANALYSIS FOR PRODUCTION OF VERY HIGH FREQUECY. SILICON. *TRANSISTORS.) *MANUFACTURING METHODS. TEST EQUIPMENT FOR PRODUCTION OF TRANSISTORS.

***TRANSPORT PROPERTIES**

AD-272 582 62-2-4 DIV. 25
OBSERVATOIRE DE PARIS-MEUDON (FRANCE).
(*GLOW DISCHARGES OF NITROGEN. HELIUM. *RARE GASES.) (ELECTRONS. DISSOCIATION. ELECTRON TRANSITIONS. *TRANSPORT PROPERTIES *RECOMBINATION REACTIONS.) (INSTRUMENTATION AND MEASUREMENT OF ELECTRICAL CONDUCTANCE.)

AD-272 773 62-2-4 DIV. 25
PHYSICS ENGINEERING CHEMISTRY CORP., BOULDER, COLO.
(*QUANTUM MECHANICS. *GASES. *TRANSPORT PROPERTIES. VISCOSITY. SHEAR STRESSES.) TENSOR ANALYSIS.

AD-272 797 62-2-4 DIV. 20
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*SCATTERING. *TRANSPORT PROPERTIES. DIFFERENTIAL CROSS SECTION. *ATOMS. *IONS. ELECTRONS.) (NUCLEAR ENERGY. NUCLEAR REACTIONS. THERMONUCLEAR REACTIONS.) *BIBLIOGRAPHY.

AD-272 814 62-2-4 DIV. 25
ADVANCED KINETICS, INC., COSTA MESA, CALIF.
(*PLASMA PHYSICS. *HIGH TEMPERATURE RESEARCH. STABILITY.) (GAS IONIZATION AND *TRANSPORT PROPERTIES OF HYDROGEN UNDER *MAGNETIC PINCH.) (ELECTROMAGNETIC *WAVES. THERMAL RADIATION. MAGNETIC FIELDS. DIPOLE MOMENTS.) (INSTRUMENTATION. VACUUM SYSTEMS. PHOTOMULTIPLIERS. HIGH SPEED PHOTOGRAPHY.)

AD-272 909 62-2-4 DIV. 25
AEROCHEM RESEARCH LABS., INC., PRINCETON, N. J.
(*HEAT TRANSFER AND THERMAL CONDUCTIVITY OF *ROCKET PROPELLANTS TO SOLIDS.) (*TRANSPORT PROPERTIES AND COMBUSTION OF GASES. AIR. ETHYLENE. OXYGEN. HYDROGEN.) (*EXPLOSIONS IN PRESSURE CAPSULES. TEMPERATURE. PRESSURE. THERMODYNAMICS. HIGH-PRESSURE RESEARCH. COOLING.) (INSTRUMENTATION AND LABORATORY EQUIPMENT.) (FUNCTIONS. PARTIAL DIFFERENTIAL EQUATIONS.)

AD-272 919 62-2-4 DIV. 20
GENERAL DYNAMICS/FORT WORTH, TEX.
(*ELASTIC SCATTERING AND *TRANSPORT PROPERTIES OF NUCLEAR REACTIONS IN WATER.) (SHIELDING. NEUTRONS. *NEUTRON FLUX DENSITY. NUCLEI. FISSION. NUCLEAR ENERGY.) (DIFFERENTIAL CROSS SECTION. DIFFERENTIAL GEOMETRY. OPERATORS (MATHEMATICS). POLYNOMIALS. FUNCTIONS.) *TABLES.

AD-272 954 62-2-4 DIV. 25
GENERAL ATOMIC DIV., GENERAL DYNAMICS CORP., SAN DIEGO, CALIF.
(EXCITATION OF *ELECTRONS IN GASES. SEMICONDUCTORS AND METALS.) (*RECOMBINATION REACTIONS. *TRANSPORT PROPERTIES. IONIZATION.) (SECONDARY EMISSION. NUCLEAR ENERGY. GAMMA RAYS. CONDUCTIVITY.) (ELECTRONIC EQUIPMENT. CAPACITORS. RESISTORS. TRANSISTORS. TRANSMISSION LINES. ELECTRIC CABLES.)

***TUNED AMPLIFIERS**

AD-272 887 62-2-4 DIV. 8
AIRBORNE INSTRUMENTS LABS., INC., DEER PARK, LONG ISLAND, N. Y.
(DESIGN OF C BAND. *MICROWAVE AMPLIFIERS. *TUNED AMPLIFIERS.) (THEORY OF ULTRA HIGH FREQUENCY AMPLIFIERS.) (DIODES USING SILICON. GALLIUM COMPOUNDS. ARSENIDES FOR USE IN C BAND. AMPLIFIERS.)

***TUNGSTEN**

AD-272 564 62-2-4 DIV. 27
GENERAL ELECTRIC CO., CINCINNATI, OHIO.
(*ROCKET MOTOR NOZZLES. *TUNGSTEN. SHEETS. PROCESSING. *MANUFACTURING METHODS.) (TOOLS. DESIGN.) (CONICAL BODIES OF METAL PLATES. PRODUCTION. LATHES.)

AD-272 781 62-2-4 DIV. 17
UNIVERSAL-CYCLOPS STEEL CORP., BRIDGEVILLE, PA.
(*TUNGSTEN. SHEETS. PRODUCTION. PROCESSING.) (ROLLING MILLS. FORGING. EXTRUSION. HEAT TREATMENT. TEMPERATURE. MECHANICL PROPERTIES. PHYSICAL PROPERTIES. DEFORMATION. THICKNESS. SURFACE PROPERTIES. HARDNESS. MICROSTRUCTURE.) METALS.

AD-272 977 62-2-4 DIV. 26
ROLLA METALLURGY RESEARCH CENTER, BUREAU OF MINES, MO.
(METAL COATINGS BY *VAPOR PLATING OF *TUNGSTEN BY PYROLYSIS OF MIXTURES OF GASES. HYDROGEN. TUNGSTEN COMPOUNDS. FLUORIDES.) (GRAINS (METALLURGY). CRYSTAL STRUCTURE. MICROSTRUCTURE. HARDNESS. CHEMICAL IMPURITIES. SILICON.) *ROCKET MOTOR NOZZLES. COATINGS. METALLIC SMOKE DEPOSITS.

AD-272 997 62-2-4 DIV. 17
SOLAR AIRCRAFT CO., SAN DIEGO, CALIF.
(REFRACTORY MATERIALS. *TUNGSTEN. *BRAZING. SILVER SOLDERS.) (SOLDERING ALLOYS. PLATINUM ALLOYS. BORON ALLOYS. ADDITIVES. POWDER METALS. TUNGSTEN.) (METAL JOINTS. *LOAD JOINTS. DIFFUSION. HEAT TREATMENT. THICKNESS.) (TUNGSTEN COMPOUNDS. BORIDES. ADDITIVES. FOILS. TITANIUM. ZIRCONIUM. TESTS. SHEAR STRESSES. X-RAY DIFFRACTION ANALYSIS.)

***ULTRASONICS**

AD-272 668 62-2-4 DIV. 17
SHEFFIELD CORP., DAYTON, OHIO.
(*HEAT RESISTANT ALLOYS, STEEL, STAINLESS STEEL, CHROMIUM ALLOYS, COBALT ALLOYS, MOLYBDENUM ALLOYS, NICKEL ALLOYS, TITANIUM ALLOYS, VANADIUM ALLOYS, ALUMINUM ALLOYS, MACHINING, PROCESSING,) (*MACHINE TOOLS, *GRINDERS, GRINDING WHEELS, *ULTRASONICS VIBRATION,) TEST EQUIPMENT, INSTRUMENTATION, TESTS, ALLOYS.

***ULTRAVIOLET RADIATION**

AD-272 606 62-2-4 DIV. 25
HAWAII INST. OF GEOPHYSICS, HONOLULU.
(*ABSORPTION OF *OXYGEN IN *ULTRAVIOLET RADIATION, VACUUM SYSTEMS, GAS IONIZATION,) (PHOTOMULTIPLIERS, PHOTOELECTRIC EFFECT, MONOCHROMATIC LIGHT, DISCHARGE TUBE,) (EXPERIMENTAL DATA, TABLES,)

***UNDERGROUND EXPLOSIONS**

AD-272 681 62-2-4 DIV. 22
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
(*UNDERGROUND EXPLOSIONS, BLAST, *CRATERING, *SAND, *CLAYS, TESTS, TEST METHODS,) (SAND, CLAYS, PARTICLES, ACCELERATION, MEASUREMENT,)

***UPPER ATMOSPHERE**

AD-272 794 62-2-4 DIV. 25
GEOPHYSICS CORP. OF AMERICA, BOSTON, MASS.
(*SOLAR SPECTRUM, ANALYSIS BY OPTICAL EQUIPMENT, PHOTOMETERS, PHOTOMULTIPLIERS, MEASUREMENT, PHOTONS,) (TABLES, ASTRONOMICAL DATA,) PLASMA PHYSICS, *SOLAR NOISE AND *EXTRATERRESTRIAL RADIO WAVES IN *UPPER ATMOSPHERE.

***VACUUM SYSTEMS**

AD-272 987 62-2-4 DIV. 30
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(DESIGN OF *VACUUM SYSTEMS, *TORSION BALANCES, QUARTZ, WIRE, ELASTICITY, MAGNETS, COILS,) (*INSTRUMENTATION, MEASUREMENT,)

***VAPOR PLATING**

AD-272 977 62-2-4 DIV. 26
ROLLA METALLURGY RESEARCH CENTER, BUREAU OF MINES, MO.
(METAL COATINGS BY *VAPOR PLATING OF *TUNGSTEN BY PYROLYSIS OF MIXTURES OF GASES, HYDROGEN, TUNGSTEN COMPOUNDS, FLUORIDES,) (GRAINS (METALLURGY), CRYSTAL STRUCTURE, MICROSTRUCTURE, HARDNESS, CHEMICAL IMPURITIES, SILICON,) *ROCKET MOTOR NOZZLES, COATINGS, METALLIC SMOKE DEPOSITS.

***VARNISHES**

AD-272 677 62-2-4 DIV. 14
AERONAUTICAL MATERIALS LAB., NAVAL AIR MATERIAL CENTER, PHILADELPHIA, PA.
(*VARNISHES, *AIRCRAFT FINISHES FOR NAVAL AIRCRAFT, CONTROL SURFACES, THIN FILMS, *ACRYLIC RESINS, *NITROCELLULOSE, THICKNESS, RESISTANCE TO THERMAL RADIATION, NUCLEAR EXPLOSIONS,) (TESTS, REFLECTION, ADHESION, IMPACT SHOCK, FATIGUE (MECHANICS), CLIMATIC FACTORS,) MILITARY REQUIREMENTS, SPECTROPHOTOMETERS.

***VIBRATION ISOLATORS**

AD-272 911 62-2-4 DIV. 25
DOUGLAS AIRCRAFT CO., INC., EL SEGUNDO, CALIF.
(*AIRFRAMES, AIRPLANE PANELS, SHEETS, STEEL, ALUMINUM ALLOYS, VIBRATION, JET ACOUSTIC OSCILLATIONS, *DAMPING, ADHESION, VISCOSITY, ELASTICITY, ACOUSTIC INSULATION, *VIBRATION ISOLATORS, MATERIALS, COATINGS, *PLASTIC COATINGS, RUBBER COATINGS,) (POLYMERS, BUTADIENES, VINYL RADICALS, NYLON, EPOXY RESINS, POWDER METALS, ADDITIVES,) (ALUMINUM FOILS, LAMINATES, ADHESIVES,) TEST METHODS.

***VISCOSITY**

AD-272 772 62-2-4 DIV. 9
POLYTECHNIC INST. OF BROOKLYN, N. Y.
(*VISCOSITY, *LIQUIDS, FLUID FLOW, MIXTURES,) (FLUID MECHANICS, SOLUTIONS, MOLECULES, THERMODYNAMICS,) INTEGRAL EQUATIONS.

***VISION**

AD-272 762 62-2-4 DIV. 28
ARMED FORCES-NRC VISION COMMITTEE, WASHINGTON, D. C.
(*SYMPOSIA, ARMED FORCES, *VISION, *VISUAL PERCEPTION, SPACE PERCEPTION, VISUAL THRESHOLDS, STEREOSCOPIC VISION, PHOTOGRAPHIC ANALYSIS, AERIAL RECONNAISSANCE, DARK ADAPTATION,) ASTRONAUTICS, WARFARE.

***VISUAL PERCEPTION**

AD-272 762 62-2-4 DIV. 28
ARMED FORCES-NRC VISION COMMITTEE, WASHINGTON, D. C.
(*SYMPOSIA, ARMED FORCES, *VISION, *VISUAL PERCEPTION, SPACE PERCEPTION, VISUAL THRESHOLDS, STEREOSCOPIC VISION, PHOTOGRAPHIC ANALYSIS, AERIAL RECONNAISSANCE, DARK ADAPTATION,) ASTRONAUTICS, WARFARE.

***VOICE COMMUNICATION SYSTEMS**

AD-272 547 62-2-4 DIV. 5
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
(*VOICE COMMUNICATION SYSTEMS, SPEECH TRANSMISSION, SPEECH, INTELLIGIBILITY, NOISE, EFFECTIVENESS,)

***VOLTMETERS**

AD-272 699 62-2-4 DIV. 8
CONTRONICS, BOSTON, MASS.
(DESIGN OF *VOLTMETERS, SHIPBORNE, *DISPLAY SYSTEMS, *ANALOG-TO-DIGITAL CONVERTERS, SEMICONDUCTORS, TRANSISTORS, DIODES,) (SUBMINIATURE ELECTRONIC EQUIPMENT, ELECTRONIC CIRCUITS, PRINTED CIRCUITS, PACKAGING, TRIGGER CIRCUITS,)

***VULCANIZATES**

AD-272 671 62-2-4 DIV. 14
NAUGATUCK CHEMICAL DIV., UNITED STATES RUBBER CO., CONN.
(*ELASTOMERS, *HEAT RESISTANT POLYMERS, *VULCANIZATES, SYNTHESIS, POLYMERS, HYDROXIDES, PHENYL RADICALS, ETHERS, SILANE, SILICONES,) (QUINONES, BROMIDES, PHENOLS,) (CHEMICAL REACTIONS, CONDENSATION REACTIONS, HYDROLYSIS, COPOLYMERIZATION, FRACTIONATION,) CHROMATOGRAPHIC ANALYSIS.

***WAKE**

AD-272 628 62-2-4 DIV. 25
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(*DOPPLER SYSTEMS, MEASUREMENT OF *WAKE, IONIZATION BY ALUMINUM OR NYLON, *HYPERVELOCITY PROJECTILES FROM HYPERVELOCITY GUNS INTO STORAGE TANKS,) (ELECTRONIC EQUIPMENT, INSTRUMENTATION, *RADIOFREQUENCY SPECTRUM ANALYZERS, *WAVEGUIDES, *RADIO SIGNALS, OSCILOSCOPES, PHASE SHIFTERS,) (ELECTROMAGNETIC WAVES, WAVE TRANSMISSION, THERMAL RADIATION,)

***WATER ENTRY**

AD-272 577 62-2-4 DIV. 9
NAVAL ORDNANCE TEST STATION, CHINA LAKE, CALIF.
(*SPHERES, *WATER ENTRY, *LOAD DISTRIBUTION,) (HYDRODYNAMICS, DRAG, FLUID FLOW,)

***WATER VAPOR**

AD-272 554 62-2-4 DIV. 25
AERONUTRONIC, NEWPORT BEACH, CALIF.
(INFRARED RADIATION, ABSORPTION, *WATER VAPOR,) (INFRARED RADIATION, ATMOSPHERE, TRANSMISSION,) TABLES.

***WELDED JOINTS**

AD-272 686 62-2-4 DIV. 17
BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
(METALS, *STEEL, *WELDING, ARC WELDING, ELECTRON BEAMS, METAL JOINTS, *WELDS, *WELDED JOINTS, HEAT TREATMENT,) (TESTS, MECHANICAL PROPERTIES, TENSILE PROPERTIES, DEFORMATION, FRACTURE (MECHANICS), MICROSTRUCTURE, METALLURGICAL ANALYSIS, MICROPHOTOGRAPHY, GRAINS (METALLURGY), MICROS COPY, X RAYS,) ROCKET CASES.

***WELDING**

AD-272 656 62-2-4 DIV. 26
MASSACHUSETTS INST. OF TECH., DIV. OF SPONSORED RESEARCH, CAMBRIDGE.
(ROCKET CASES, *WELDING, *STEEL SHEETS, PROCESSING, *MANUFACTURING METHODS,) (ARC WELDING BY ELECTRODES, TUNGSTEN, GASES, SHIELDING VS ELECTRON BEAMS, WELDS, MECHANICAL PROPERTIES, FRACTURE (MECHANICS), HARDENING, EFFECTIVENESS, HEAT TREATMENT,)

***WELDS**

AD-272 686 62-2-4 DIV. 17
BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
(METALS, *STEEL, WELDING, ARC WELDING, ELECTRON BEAMS, METAL JOINTS, *WELDS, *WELDED JOINTS, HEAT TREATMENT,) (TESTS, MECHANICAL PROPERTIES, TENSILE PROPERTIES, DEFORMATION, FRACTURE (MECHANICS), MICROSTRUCTURE, METALLURGICAL ANALYSIS, MICROPHOTOGRAPHY, GRAINS (METALLURGY), MICROSCOPY, X RAYS,) ROCKET CASES.

***WETTING AGENTS**

AD-272 579 62-2-4 DIV. 4
NAVAL RESEARCH LAB., WASHINGTON, D. C.
(THIN FILMS, *MONOMOLECULAR FILMS, FLUORIDES, *FATTY ACIDS, FLUORINATION, *WETTING AGENTS, *ADSORPTION, SURFACES, CHROMIUM, PLATINUM, NICKEL, QUARTZ, GLASS,) (STEREOCHEMISTRY, DIPOLE MOMENTS, CHEMICAL BONDS, THEORY,)

***WIND**

AD-272 644 62-2-4 DIV. 25
ARMY SIGNAL MISSILE SUPPORT AGENCY, WHITE SANDS MISSILE RANGE, N. MEX.
(MATHEMATICAL ANALYSIS OF *SOUND TRANSMISSION IN ATMOSPHERE,) (SOUND, PROPAGATION, SNELL'S LAW, ROCKETS, EXTERIOR BALLISTICS, *WIND,)

AD-272 689 62-2-4 DIV. 22
ARMY SIGNAL MISSILE SUPPORT AGENCY, WHITE SANDS MISSILE RANGE, N. MEX.
(*MATHEMATICAL ANALYSIS, *WIND, *SOUNDING ROCKETS,) INSTRUMENTATION, DATA PROCESSING SYSTEMS, TABLES, LEAST SQUARES METHOD.

***WINGS**

AD-272 908 62-2-4 DIV. 9
AEROSPACE CORP., LOS ANGELES, CALIF.
(*AIRFOILS, *WINGS, *BODIES OF REVOLUTION, *FUSELAGES, *AIRPLANE PANELS, AERODYNAMICS, TRANSONICS, SUPERSONICS, HYPERSONICS, DOWNWASH, ELASTICITY, LIFT, PRESSURE, GUST LOADS, TRANSIENTS, MATHEMATICAL ANALYSIS, INTEGRAL EQUATIONS, DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS, MATRIX ALGEBRA,) VISCOSITY, SHOCK WAVES, VORTICES, INTERFERENCE.

***WOOD PULP FIBERS**

AD-272 636 62-2-4 DIV. 14
INSTITUTE OF PAPER CHEMISTRY, APPLETON, WIS.
(*FIBERBOARD, *WOODPULP FIBERS, *WOODPULP, STABILITY, CHEMICAL WARFARE AGENT, POISONOUS GASES,) (ADDITIVES TO CYANOGEN CHLORIDES, ETHANOLS, AMINES, CALCIUM COMPOUNDS, CARBONATES, ZINC COMPOUNDS, COPPER COMPOUNDS, OXIDES,) (AGING, TEMPERATURE, STORAGE, WATER, ABSORPTION,)

***X-RAY ABSORPTION ANALYSIS**

AD-272 604 62-2-4 DIV. 25
CORNELL U., ITHACA, N. Y.
(*PHOTONS, ABSORPTION, *HELIUM, *LITHIUM,) (ATOMS, ENERGY, ABSORPTION, *ELECTRON TRANSITION,) (INSTRUMENTATION, *X-RAY ABSORPTION ANALYSIS, PHOTOMULTIPLIERS,)

***X-RAY SPECTROSCOPY**

AD-272 771 62-2-4 DIV. 25
POMONA COLL., CLAREMONT, CALIF.
(*X-RAY SPECTROSCOPY, X RAYS, REFLECTION, ABSORPTION, DIFFRACTION, FLUORESCENCE, *SECONDARY EMISSION,) (X-RAY SPECTROSCOPY, CRYSTALS, CELLS (BIOLOGY),) (CRYSTALS *MICROSTRUCTURE, METALLIC CRYSTALS, ELECTRON DIFFRACTION ANALYSIS,)

***ZINC COMPOUNDS**

AD-272 684 62-2-4 DIV. 10
DENTAL RESEARCH FACILITY, NAVAL TRAINING CENTER, GREAT LAKES, ILL.
(DENTAL RESEARCH, *DENTAL MATERIALS, *ZINC COMPOUNDS, *OXIDES, *PHOSPHATES, *SILVER ALLOYS, *SILICATES,)

AD-272 786 62-2-4 DIV. 25
WESTINGHOUSE ELECTRIC CORP., BLOOMFIELD, N. J.
(LUMINESCENCE, *LUMINESCENT MATERIALS, LUMINESCENT PIGMENTS, *PHOSPHORS, *CRYSTAL PHOSPHORS, COLORS,) (*COMPLEX COMPOUNDS, *ZINC COMPOUNDS, *SULFIDES AND COPPER COMPOUNDS, THALLIUM COMPOUNDS, LITHIUM COMPOUNDS, IRON COMPOUNDS, IODIDES, CADMIUM COMPOUNDS, ALUMINUM COMPOUNDS, MERCURY COMPOUNDS, OXYGEN COMPOUNDS,) (PHOTOEMISSION, EXCITATION,) (DIELECTRICS, PLASTICS, IMPREGNATION, PHOSPHORS,)

***ZIRCONIUM COMPOUNDS**

AD-272 835 62-2-4 DIV. 25
CINCINNATI U., OHIO.
(*CERAMIC MATERIALS, *REFRACTORY MATERIALS, *THERMODYNAMICS, HIGH TEMPERATURE RESEARCH, CRYSTALS, LATTICES,) (ELECTROLYTIC CELLS, IRON COMPOUNDS, OXIDES, ELECTRIC POTENTIAL,) (*CHROMIUM COMPOUNDS AND *ZIRCONIUM COMPOUNDS, *OXIDES,) (CHROMIUM ALLOYS, NICKEL ALLOYS,) (THEORY, *PHASE STUDIES, X-RAY DIFFRACTION ANALYSIS, METALLURGICAL ANALYSIS,)

TECHNICAL ABSTRACT BULLETIN

1. AIRCRAFT AND FLIGHT EQUIPMENT

AD-272 893 Div. 1, 12
(TISTA/SEB) OTS price $6.60

Radioplane Div., Northrop Corp., Hawthorne, Calif.
TALOS/XQ-4B TARGET SERVICE PROGRAM AT NOMTF, WSMR, NEW MEXICO,
by W. L. Bridwell. 21 Oct 61, 1v. incl. illus. table (Rept. no. 3175)
(Contract NOw 61-0938-r)
Unclassified report

DESCRIPTORS: (*Target drones for Interception by Guided missiles, Surface to air, Solid rocket propellants.) (Flight testing, Reliability, Effectiveness, Recovery, Tests.)

The results of the Talos/XQ-4B flight service program are presented. The XQ-4B target equipment demonstrated exceptional performance and reliability. The target drone can easily perform throughout its predicted flight envelope if operations are conducted on a range which allows full advantage to be taken of the target's range and endurance capabilities.

AD-272 905 Div. 1, 9
(TISTA/LSK) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
A BRIEF EVALUATION OF HELICOPTER WAKE AS A POTENTIAL OPERATIONAL HAZARD TO AIRCRAFT,
by Andrew B. Connor and Thomas C. O'Bryan. Mar 62, 25p. incl. illus. table, 6 refs.
(NASA Technical note D-1227)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1227.

DESCRIPTORS: (*Helicopters, Downwash, Turbulence, Wake, Hazards to Airplanes, Aircraft during Air traffic, Flight, Flight testing.) Aviation safety.

A number of incidents of encounters with severe turbulence occurring in the general vicinity of operating helicopters have been reported by pilots, specifically in airport traffic situations. In relation to this problem flight tests were conducted with an airplane and a single-rotor helicopter to determine some characteristics of the helicopter wake and its possible upsetting tendencies on an airplane. A sample procedure for estimating important wake characteristics is included. Flight tests with the airplane and helicopter have shown that helicopter wake presents a potential hazard to aircraft operating near the wake. Suggested operating precautions to minimize the hazard potential of a helicopter wake include reminding pilots of aircraft following a helicopter to remain above the helicopter flight path and, if in doubt about relative positions, to extend the separation interval between aircraft. An exact time interval was not determined, but a separation estimated to be about 1 min appears to be reasonable with most of the present generation helicopters. (Author)

2. ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-272 522 Div. 2
(TISTP/FR) OTS price $1.60

McGill U. (Canada).
ATLAS OF MEAN MONTHLY ALBEDO OF ARCTIC SURFACES,
by P. Larsson and Svenn Orvig. Nov 61, 14p. incl. illus. 40 refs. (Publication in Meteorology no. 45; Scientific rept. no. 2)
(Contract AF 19(604)7415, Proj. 8623)
(AFCRL-1051) Unclassified report

DESCRIPTORS: (*Arctic regions, *Albedo (Astronomy), Periodic variations, Maps.) (Arctic regions, *Snow, *Ice.)

Monthly maps of mean albedo in wide class groups (20 per cent intervals) are presented. They are mainly compiled from published maps of the various parameters involved and may be broken down into three groups: those concerned with sea areas, those concerned with land areas and those of a climatological nature. Albedo information has been included for winter months in areas with continuous darkness, both for continuity and to stress the fact that the maps express surface conditions in terms of albedo. (Author)

AD-272 552 Div. 2
(TISTP/GRW) OTS price $6.60

New York U. Coll. of Engineering, N. Y.
A STATISTICAL INVESTIGATION OF THE TROPOPAUSE OVER THE CENTRAL TROPICAL PACIFIC,
by Richard S. Greenfield. Feb 62, 62p. incl. illus. tables, 24 refs. (Scientific rept. no. 4)
(Contract AF 19(604)6146, Proj. 8628)
(AFRCL 62-214) Unclassified report

DESCRIPTORS: (*Lapse rate, Temperature inversion, *Atmosphere, Statistical analysis, Tropical regions, Pacific Ocean.)

Tropopause heights and temperatures at Johnston Island and Majuro, Marshall Islands, are statistically analyzed. The analyses reveal that these parameters have Gaussian distributions, have no significant diurnal variations, and have significant seasonal variations. While there appears to be no latitudinal variation of tropopause height, there is an apparent latitudinal tropopause temperature gradient. The wind structure in the vicinity of the tropopause is examined. In 16 to 30% of the observations there are two major lapse rate discontinuities, indicating the apparent presence of multiple, foliated, or diffuse tropopause situations. An apparent relationship between the seasonal standard deviation of tropopause height and the frequency of occurrence of significant vertical wind shears in the vicinity of the tropopause is observed. Some inferences are drawn regarding the mechanism of tropopause maintenance over the central, tropical Pacific. (Author)

AD-272 566 Div. 2
(TISTP/GRW) OTS price $13.50

Deutscher Wetterdienst, Hohenpeissenberg (Germany).
INVESTIGATIONS ON THE STRUCTURE OF PRECIPITATION.
Final rept., 1 Apr 60-31 Mar 61,
by Johannes Grunow. 31 Mar 61, 109p. illus.
(Contract DA 91-591-EUC-1386)
Unclassified report

DESCRIPTORS: (*Raindrops, Intensity, Recording devices, Germany.) (*Precipitation, Climatic factors, Atmosphere, Collecting methods.)

Recording devices were employed to carry out a continuous measurement of the components of precipitation structure: duration, intensity and drop structure. A new rate-of-rainfall-recorder as well as a drop-stain-recorder proved to be particularly helpful with these operations. (Author)

AD-272 573 Div. 2, 25, 8
(TISTP/FR) OTS price $1.60

Manchester U. (Gt. Brit.).
SPECTROPHOTOMETRIC STUDY OF THE LUNAR SURFACE.
Annual summary rept. no. 1,
by Zdenek Kopal. Mar 61, 15p. incl. illus.
3 refs.
(Contract AF 61(052)378)
(AFCRL-860) Unclassified report

DESCRIPTORS: (*Moon, Minerals, Luminescence, *Spectrographic analysis, Polarization, Measurement.) (*Spectrophotometers, Polariscopes, Design, Photomultipliers.)

It is proposed to study the luminescence of the lunar surface more extensively and with greater photometric accuracy than was achieved previously, and to measure the variation of polarisation of moonlight as a function of wavelength. A design study was made for a luminescence spectrometer and a description is given of completed instrument based on this design. A prototype polarimeter was used with a 15-inch telescope to gain experience in this field; the final instrument is now nearing completion. Experiments are in progress to find the most suitable electronic system for these instruments. It is expected that extensive astronomical observations will be carried out in the near future. (Author)

AD-272 575 Div. 2
(TISTP/FR) OTS price $1.10

Manchester U. (Gt. Brit.).
LUNAR PHOTOMETRIC AND TOPOGRAPHIC ANALYSIS.
Final technical rept., 1 May-31 Oct 60,
by Zdenek Kopal. Dec 60, 3p.
(Contract AF 61(052)380; Continuation of Contract AF 61(052)168)
(AFCRL-858) Unclassified report

DESCRIPTORS: (*Moon, Terrain, Photographic analysis.)

AD-272 576 Div. 2, 25
(TISTP/WH) OTS price $11.00

High Altitude Observatory, Boulder, Colo.
THE STRATOSPHERIC SOLAR AUREOLE.
Doctoral thesis,
by John Allen Eddy. 1961, 128p. incl. illus. tables, 65 refs.
(Contract Nonr-39305)
Unclassified report

DESCRIPTORS: (*Solar corona, *Light, *Scattering by Aerosols.) (Astrophysics, Solar atmosphere, Particles, Light transmission.) Theses.

The theory of light scattering by small particles is summarized to develop the formulae needed to interpret solar aureole data obtained in balloon flights at stratospheric altitudes. Included are the Rayleihg law for small particles, the Chandrasekhar solution of the planetary scattering problem, and the Mie theory for large particle scattering. Observations cover the wavelength range from 0.37 to 0.79 micron at the scattering angle 2.4 degrees, and over the altitude range from 42,000 ft. to 80,000 ft. The findings suggest that the form of the particle size distribution changes with altitude, becoming a steeper function of particle radius at higher altitudes. (Author)

AD-272 589 Div. 2
(TISTP/FR) OTS price $7.60

Hamburger Sternwarte (Germany).
SPECTROPHOTOMETRY OF GALACTIC NEBULAE ORION NEBULA I.
Technical rept.,
by K. Wurm. 1 July 61, 71p. incl. illus. tables, 31 refs. (Technical rept. no. 1)
(Contract AF 61(052)259)
(AFCRL-1025) Unclassified report

DESCRIPTORS: (*Nebulae, Photographic analysis, Spectrographic analysis.) (Brightness, Ionization, Hydrogen, Helium, Stars, Monochromatic light.) Astrophysics.

The physical conditions within the Orion nebula were investigated. The luminosity in H-beta and the total mass of the nebula are determined. The nebula is highly ionized up to its visible borders and is found to be mass-limited (not radiation-limited). The origin of the continuous emission was found to be a scattering by dust and

not a two-photon emission by hydrogen. The highest expansion velocities are connected with the diluted masses near the border. It appears highly probable that the Trapezium stars are not involved in the central bright masses but are situated between these masses and the observer. (Author)

AD-272 634 Div. 2
(TISTP/MFA) OTS price $1.60

Geophysical Inst., U. of Alaska, College.
HIGH LATITUDE GEOPHYSICAL DATA FOR (OCTOBER-NOVEMBER) 1961.
1 Dec 61 12p. (Rept. no. UAG-C-25)
Unclassified report

DESCRIPTORS: (*Geophysics, Earth, Electric current, Terrestrial magnetism, *Ionosphere, Cosmic rays, Extraterrestrial radio waves, Aurorae.) (Data, *Tables.) (*Arctic regions, Alaska.)

AD-272 645 Div. 2
(TISTP/MFA) OTS price $5.60

Arctic Inst. of North America, Washington, D. C.
STUDIES OF THE PHYSICAL CHARACTERISTICS OF ARCTIC TERRAIN,
Final rept.,
by George P. Rigsby. July 61, 52p. 51 refs.
(Contract AF 19(604)3073, Proj. 7628)
(AFCRL-817) Unclassified report

DESCRIPTORS: (*Terrain, Analysis of *Arctic regions.) (Engineering, Physical properties of *Ice.) (*Research program administration in Oceanography, Meteorology, Geology, Thermal radiation, Marine biology, Glaciers and Geophysics.) *Bibliography.

The work conducted under the Geophysics Research Directorate in Arctic Terrain Studies is presented. Areas of investigation included the following: Arctic Ocean, Ice Free Land Areas in Northern Greenland, small lakes and glaciers in Alaska, coastal ice shelves in northern Ellesmere Island, and the engineering properties of sea ice. (Author)

AD-272 764 Div. 2, 12
(TISTP/WH) OTS price $3.60

Michigan U. Coll. of Engineering, Ann Arbor.
ATMOSPHERIC MEASUREMENTS FROM SATELLITE OBSERVATIONS OF STELLAR REFRACTION.
Technical rept.,
by L. M. Jones, F. F. Fischbach, and J. W. Peterson. Jan 62, 31p. incl. illus. 11 refs.
(Rept. no. 04963-1-T)
(Contract NASw-140)
Unclassified report

DESCRIPTORS: (*Atmosphere, *Meteorological data, Collecting methods, Density, Temperature, Barometric pressure, *Satellite vehicles.) (Atmosphere, Light, *Refraction, Light transmission, Stars.)

A method of obtaining atmospheric density, temperature and pressure data by observing refraction of stellar images with instruments in a satellite is described. Data acquisition and altitude range is such as to permit making of weather maps between 25 mb and perhaps 500 mb. (Author)

AD-272 831 Div. 2, 25
(TISTP/MFA) OTS price $2.25

Electro-Mechanics Co., Austin, Tex.
MAGNETIC FIELDS IN INTERPLANETARY SPACE.
Final engineering rept., 5 Jan-31 Dec 61.
31 Dec 61, 73p. incl. illus. tables, 64 refs.
(Contract AF 19(604)5221, Proj. 7601)
(AFCRL 62-225) Unclassified report

DESCRIPTORS: (*Magnetic fields, *Planetary atmospheres, Interstellar matter, *Space probes, Solar atmosphere, Solar corona, *Terrestrial magnetism, Solar noise.) (*Magnetohydrodynamics, Shock waves, Plasma physics.) (Instrumentation, Tests, Reliability, Magnetometers, Telemeter systems, Communications theory.) *Bibliography.

Available theories of the interplanetary magnetic field are in conflict and measurements which were made by probes and satellites are also in conflict. A critical analysis of the literature suggests the following field model: (1) the field at the surface of the earth is about 50,000 gamma; (2) the earth field decreases with distance from the earth according to the inverse cube; (3) the ring current, located at about 10 earth radii, opposes the earth field and causes a minimum field intensity of about 0 gamma to appear around 7 earth radii and a maximum field intensity of about 70 gamma to appear at a distance of approximately 13 earth radii; (4) the earth field continues to decrease until a steady limiting value of perhaps 20 gamma is encountered; this steady value continues through most of space; (5) shock waves, both fast and slow, may be encountered and may be expected to have amplitudes of not much greater than 100 gamma and rise times of not much less than 1 ms; and (6) anomalous increases and decreases in magnetic intensity may be expected at times of high solar activity and should, at distances beyond the ring current, be no greater than 50 gamma. (Author)

AD-272 870 Div. 2
(TISTP/GRW) OTS price $3.60

Army Electronic Proving Ground, Fort Huachuca, Ariz.
USAEPG MICROMETEOROLOGICAL RESEARCH PROGRAM.
Progress rept. for 1961.
Feb 62, 43p. 20 refs. (Rept. no. AEPG 6-50-62; AEPG Micrometeorological research note no. 2)
Unclassified report

DESCRIPTORS: (Energy, Atmosphere, Turbulence.) (Soils, Evapotranspiration, Energy.) *Micrometeorology.

The field of Micrometeorology studied encompasses varied aspects of meteorology and agriculture in a concentrated attack on the least understood portion of the earth's atmosphere: the planetary boundary layer. The program is divided into four parts: Turbulence Studies, Energy Balance Studies, Surface/Subsurface Factors Studies, and Micrometeorological Model Studies. Summaries of the annual reports by the contractors, a summary of the annual report which concerned the internal effort, and a list of the material which has been published as a result of this research are included. (Author)

Division 3 - CHEMICAL WARFARE EQUIPMENT AND MATERIALS
Division 4 - CHEMISTRY

AD-272 994 Div. 2.
(TISTP/FR) OTS price $5.60

Air Force Cambridge Research Labs., Bedford, Mass.
MICROMETEORITE COLLECTION FROM A RECOVERABLE SOUNDING ROCKET,
ed. by R. K. Soberman. Nov 61, 50p. incl. illus. table, refs. (GRD Research notes no. 71; AFCRL-1049)
(Proj. 6694) Unclassified report

DESCRIPTORS: (*Meteorites, *Collecting methods, *Sounding rockets.)

This report contains three articles regarding the Venus Flytrap collector rocket. The first article discusses the experimental details and rocket performance. The second and third articles present the results obtained to date and an interpretation of these results, respectively. (Author)

3. CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-272 580 Div. 3
(TISTM/EJH) OTS price $.75

Naval Research Lab., Washington, D. C.
CHLORATE-CANDLE FABRICATION BY HOT PRESSING,
Final rept.,
by P. R. Gustafson, S. H. Smith, Jr., and R. R. Miller. 23 Jan 62, 18p. incl. illus. tables, 14 refs. (NRL rept. no. 5732)
Unclassified report

DESCRIPTORS: (*Pyrotechnics, *Sodium compounds, *Chlorates, Fibers, Metallic textiles, Glass textiles, Binders, Powder metals, Iron, Barium compounds, Dioxides, Manufacturing methods, High pressure research, Density, Molding.) (Oxygen, Production, Submarines.) (Decomposition, Chemical reactions, Combustion.)

An investigation showed distinct advantages to manufacturing chlorate candles by a hot-pressing technique, omitting water as a binder. Small quantities of water trapped in a chlorate candle can result in the production of significant quantities of chlorine. By the hot-pressing method, high-density candles (2.5 g/cc) were produced which yield the equivalent of 200 cu ft of oxygen (STP) from 490 cu in. of candle volume. Two methods can be used for forming candles: molding and extrusion. Molded candles are best formed at temperatures from 225 to 245 C at pressures from 10,000 to 5000 psi, respectively. A double-action ram can be used; with a single-action ram, successive pressing increments should be used to avoid uneven distribution of density. Use of a glass-wool blanket or oven annealing is recommended to avoid thermal stresses on cooling. (Author)

AD-272 650 Div. 3, 16
(TISTB/LH) OTS price $21.00

Naval Biological Lab., U. of Calif., Oakland.
(No title).
Technical progress rept. no. 31, 1 July-31 Dec 61,
by Stewart H. Madin. 31 Dec 61, 377p. incl. illus. tables, refs.
(Contracts Nonr-22273 and Nonr-22276; In cooperation with School of Public Health, U. of Calif.)
Unclassified report

DESCRIPTORS: (*Medical research, *Scientific reports.) (Coccidioides, Immunology.) *Bibliography, *Aerobiology, Pasteurella, Virus diseases, Epidemiology, Biophysics, Medical equipment.

AD-272 972 Div. 3, 10
(TISTM/GEC) OTS price $3.60

Armour Research Foundation, Chicago, Ill.
INHIBITION OF FLASHING OF AEROSOLS.
Quarterly progress rept. no. 7, 15 Oct 61-14 Jan 62,
by Roy Kamo. 21 Feb 62, 26p. incl. illus. tables, 5 refs.
(Contract DA 18-108-405-cml-777, Proj. D217)
Unclassified report

DESCRIPTORS: (*Aerosols, Measurement, *Flame propagation, *Ignition, Temperature, Butyl radicals, Methyl radicals, Phthalates, Nucleation, Sodium compounds, Chlorides, Drops.) (Inhibition, Additives, Pyrophoric materials.) Physical properties.

The lean flammability limits and the upward flame propagation velocities of dibutyl and dimethyl phthalates were determined. The effect of nucleation with NaCl was investigated. Spontaneous ignition temperatures were determined for dimethyl phthalate and dibutyl phthalate and several additives. The lean flammability limits were about the same for various droplet size. The flame propagation velocities of dimethyl phthalate were lower than that for dibutyl phthalate. The spontaneous ignition temperature of dimethyl phthalate (601 C) was higher than that of dibutyl phthalate (247 C). NaCl nucleated dibutyl phthalate showed some tendency towards increasing the lean flammability limits. Some of the pyrophoric compound additives such as iron pentacarbonyl, and triethyl aluminum exhibited excellent inhibiting qualities. (Author)

4. CHEMISTRY

AD-272 579 Div. 4, 25
(TISTM/EJH) OTS price $.75

Naval Research Lab., Washington, D. C.
THE EFFECT OF PROGRESSIVE FLUORINATION OF A FATTY ACID OF THE WETTABILITY OF THE ADSORBED, CONDENSED MONOLAYER.

Interim rept.,
by E. G. Shafrin and W. A. Zisman. 30 Jan 62, 18p. incl. illus. tables, 24 refs. (NRL rept. no. 5716)
Unclassified report

DESCRIPTORS: (Thin films, *Monomolecular films, Fluorides, *Fatty acids, Fluorination, *Wetting agents, *Adsorption, Surfaces, Chromium, Platinum, Nickel, Quartz, Glass.) (Stereochemistry, Dipole moments, Chemical bonds, Theory.)

A study was made of the wettability of monomolecular films of a series of heptadecanoic acids with substitutions in the 17-position of perfluoroethyl (perfluoro-ethyl), perfluoro-propyl, perfluoro-pentyl, and perfluoro-heptyl groups. Films of the four acids were prepared on Cr by adsorption from the melt; films of the perfluoroheptyl compound were also prepared on other metals (Pt, Ni) and on siliceous surfaces. The films adsorbed on metal substrates exhibited uniformly high contact angles; those on quartz and on soda-lime glass were more wettable and more vulnerable to attack by sessile drops of hydrogen-bonding liquids. There was little difference in wettability between films of the longest terminally fluorinated aliphatic acid (17-(perfluoro-heptyl)heptadecanoic acid) reported here and the fully fluorinated acid (perfluorooctanoic acid) containing shorter perfluoroalkyl groups were more wettable than the analogous fully fluorinated acids. This and the differences in the effects of homology for the two types of acids are discussed in terms of the configuration and orientation of the adsorbed molecules. (Author)

AD-272 594 Div. 4, 3
(TISTM/GEC) OTS price $1.60

Monomer-Polymer, Borden Co., Philadephia, Pa.
STEREOREGULAR HIGH POLYMERS (A REVIEW OF CONTRACT DA-18-108-405-CML-297),
by Arthur Lyem. Jan 62, 15p. incl. illus. tables, 5 refs.
(Contract DA 18-108-405-cml-297)
(CRDLR-3114) Unclassified report

DESCRIPTORS: (*Polymers, *Polymerization, *Styrenes, *Ethylenes, Stereochemistry.) (Synthesis, Styrenes, Fluorides, Fluorination, Nitration, Halogenation, Solubility.) (Molecular structure, Chemical reactions, Chemical warfare agents, G agents.) (Catalysis, Catalysts, Metalorganic compounds.)

The relationship between the polymer structure and its resistance to chemical agents was correlated with its chemical and solubility behavior. Improvement in chemical resistance was achieved through the preparation of cross-linking or network polymers; chemical modification of existing polymers; and stereospecific polymerization of several olefins, styrenes, and substituted styrenes, yielding polymers of a new steric arrangement, such as isotactic (stereoregular) polystyrene. (Author)

AD-272 770 Div. 4
(TISTM/GEC) OTS price $2.60

Sheffield U. (Gt. Brit.).
RECOMBINATION OF IODINE ATOMS IN NITRIC OXIDE.
Final technical rept., 1 Jan-31 Dec 61,
by George Porter, Zoltan G. Szabo, and Michael G. Townsend. 18 Jan 62, 15p. illus. 9 refs.
(Contract DA 91-591-EUC-1670)
Unclassified report

DESCRIPTORS: (*Iodine, Atoms, Gases, Mixtures, Nitrogen compounds, Oxides and Neon, *Recombination reactions, Absorption.) (Complex ions, Photolysis, Reaction kinetics, Heat of formation.) Great Britain.

The recombination of I atoms, in the presence of mixtures of NO and Ne, was studied over a wide range of experimental conditions. At low pressures of NO, a rapid recombination occurred, resulting from the consecutive bimolecular reactions I + NO 1.2 x 10 to the 5th power sigma sub 4300 NOI, NOI + I yields NO + I2. This over-all process followed a simple thermolecular rate law. The Arrhenius activation energy of this process equaled -2.2 kcals. At high pressures of NO, the rate of recombination decreased and a new absorption band centred at 4300 angstroms, and attributed to nitrosyl iodide, NOI, was observed. The absorption decayed relatively slowly by the second order process, NOI + NOI yields 2NO + I2. The rate of loss of NOI and the rate of reformation of I2 were measured by monitoring the system at 4300 and 5200 angstroms, respectively. The rate constants of this reaction at 29 C, determined by the 2 methods, were 2.7 x 10 to the 7th power/mole/litre/sec respectively, where sigma sub 4300 was the extinction coefficient of NOI at 4300A. Equating these two rate constants yields an extinction coefficient, sigma sub 4300 equals 220. The processes measured at both wavelengths and an activation energy of 4 kcals. (Author)

AD-272 855 Div. 4, 10
(TISTM/EJH) OTS price $1.75

Olin Mathieson Chemical Corp., New Haven, Conn.
STUDY OF SUPEROXIDIZERS.
Rept. for 22 Nov 60-21 Oct 61,
by F. Martinez, J. A. Wojtowicz, and H. D. Smith.
Dec 61, 56p. incl. illus. tables, 34 refs.
(Contract AF 29(600)2695, Proj. 3827)
(AFOSR/DRA 61-7) Unclassified report

DESCRIPTORS: (Oxidizers, *Rocket oxidizers, *Hydrogen compounds, *Peroxides, *Chlorine compounds, *Fluorides, Amines, *Hydrazines, *Chlorides, *Oxides, Oxygen compounds, *Ozone, Synthesis.) (Ozone, Hydrogen, Atoms, Chemical reactions, Ammonia.) (Decomposition, Reaction kinetics, Thermochemistry, Low temperature research, Liquefied gases.) (Water vapor, Dissociation.) (Complex compounds, Nitrogen compounds, Oxides, Fluorides, Hydrazines.) (Spectrographic analysis, Infrared spectroscopy, Paramagnetic resonance.)

Studies were conducted on the preparation and characterization of hydrogen superoxide and superoxidizers such as NF2O2, NF2OONF2, ClF5 and Cl2O8. Electron spin resonance measurements on the H + O3 product revealed the presence of a free radical (HO2) which disappeared in the temperature range -130 to -120 C. Kinetic studies revealed that the decomposition of the H + O3 product was affected by phase transformations in the frozen matrix. The heat of crystallization of 50 wt % H2O2-ice was determined calorimetrically to be 45 cal/g. The mechanism of peroxide formation from dissociated water vapor was investigated. The reactions of tetrafluorohydrazine with O3, O atoms, NO2 dioxide, NO, Cl2O7 and ClF3 were investigated. Evidence for low temperature N-O-F-containing complexes was found. (Author)

Division 5 - COMMUNICATIONS

AD-272 881 Div. 4, 13, 31
(TISTM/EJH) OTS price $9.60

Thompson Ramo Wooldridge, Inc., Cleveland, Ohio.
ELECTROLYTIC CO2 REDUCTION SYSTEM.
Final rept., 15 Mar-15 Dec 61.
15 Dec 61, 105p. incl. illus. tables, 50 refs.
(Engineering rept. no. 4701)
(Contract Nonr-343100)
Unclassified report

DESCRIPTORS: (Submarines, Controlled atmospheres, *Oxidation-reduction reactions, Reduction, Chemical reactions, *Carbon dioxide, *Carbon compounds, *Monoxides, Hydrogen, Catalysts, Carbon deposits, Temperature, Gases, Moisture.) (Catalysis, Electrolysis, Chemical equilibrium, Reaction kinetics, Thermochemistry, Thermodynamics.)

This study was concerned with the reduction of CO2 with H (to form carbon and water) as a potential component of a closed environmental system. A literature survey was made in terms of 2 reaction steps identified with the process, CO2 + H2 equals CO + H2O; and CO + H2 equals C + H2O or 2CO equals C + CO2. Various thermodynamic analyses were made of the process. Thus the equilibrium composition was computed as a function of temperature for a multicomponent system involving CO2, H2, CO, CH4, H2O and C. The maximum conversion and minimum recycle rate were derived from the analysis. Various catalytic systems were studied. These included steel wool, steel wool plus a stabilized iron oxide catalyst for the water gas shift reaction, and two Ni catalysts. Each of these was studied as a function of temperature, recycle rate and moisture content of the recycled gas in terms of the reaction rate, and % conversion per pass. Recycled gas composition, C bulk density, and catalyst consumption were evaluated and C balances made. Gas composition and % conversion under conditions approaching equilibrium were also evaluated. (Author)

AD-272 949 Div. 4
(TISTM/GEC) OTS price $4.60

Aerospace Corp., Los Angeles, Calif.
METAL CARBONYLS AND SUBSTITUTED METAL CARBONYLS,
by Peter Breisacher. 8 Nov 61, 40p. incl. tables, 123 refs. (Rept. no. TDR-930(2210--12)TN-2)
(Contract AF 04(647)930)
Unclassified report

DESCRIPTORS: (*Carbonyl radicals and *Metal-organic compounds of Transition elements, *Halocarbons, Synthesis, Chemical reactions, Metalation, Displacement reactions, Reduction, Grignard reactions.) (Polycyclic compounds, Pentenes, Carbonyl radicals and Metalorganic compounds or Nitroso radicals or Salts or Halides or Alkyl radicals or Phenyl radicals or Antimony compounds and Hydrides or Nitriles or Phosphines or Arsines or Cyano radicals.)

The physical and chemical properties of the transition metal carbonyls and substituted carbonyls are reported. Special emphasis was placed on the grouping of compounds according to their reactivities with specific functional groups. Methods of preparation are presented, along with references to spectral data. This survey was made as support of the program on hydride investigations by atomic reactions. (Author)

AD-272 988 Div. 4, 25
(TISTM/EJH) OTS price $2.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
THE INFLUENCE OF IRRADIATION WITH X-RAYS ON THE KINETICS OF THE THERMAL DECOMPOSITION OF BARIUM AZIDE,
by B. V. Yerofeyev and V. V. Sviridov. Mar 62, 21p. incl. illus. tables (Technical notes FRL-TN-75; Trans. from Institut Khimii An BSSR. Nauchnykh Rabot 5:113-129, 1956)
Unclassified report

DESCRIPTORS: (*Barium compounds, *Azides, *Decomposition, Temperature, Heating, X rays, Radiation effects, Reaction kinetics, Theory, Mathematical analysis.) USSR.

The influence of preliminary irradiation with X-rays on the rate of the thermal decomposition of barium azide was studied as a function of decomposition temperature and length of preliminary irradiation. Relationships were found between the value of the induction period and the length of the preliminary irradiation. Acceleration of the reaction is replaced by deceleration after prolonged irradiation. The effect of irradiation is only negligibly weakened with time. Heating of the irradiated salt at a temperature close to the experimental temperature leads to acceleration of the reaction. A moist preparation of BaN6 decomposes more slowly, and a smaller effect of preliminary irradiation is characteristic of it. An effect analogous to that caused by preliminary irradiation is produced by brief heating of the nonirradiated salt at the experimental temperature. Prolonged storage of the nonirradiated salt leads to an acceleration of the reaction. It was established that the total activation energy of the thermal decomposition of barium azide decreases after X-ray irradiation. (Author)

5. COMMUNICATIONS

AD-272 547 Div. 5
(TISTB/AW) OTS price $2.60

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
THE VALIDITY OF THE ARTICULATION INDEX,
by K. D. Kryter. Oct 61, 10p. illus. 8 refs.
(Contract AF 19(604)4061)
(AFCCDD TN 61-35)
(ESD TDR 62-3) Unclassified report

DESCRIPTORS: (*Voice communication systems, Speech transmission, Speech, Intelligibility, Noise, Effectiveness.)

This report shows that the Articulation Index is a valid predictor of the Intelligibility of Speech under a wide variety of conditions of noise masking and speech distortion. It is recommended that the Articulation Index be used to evaluate the performance of many speech communication systems when speech intelligibility testing of the system is not practical. (Author)

6. DETECTION

AD-272 597 Div. 5, 12
(TISTW/EET) OTS price $1.60

ITT Kellogg, Chicago, Ill.
FIXED GROUND COMMUNICATION SYSTEMS. WEAPONS SYSTEM 107A-1.
Program progress rept. no. 57 for Jan 62.
Jan 62, 14p.
(Contracts AF 04(647)312, AF 04(647)461 and others)
Unclassified report

DESCRIPTORS: (*Guided missiles, Surface to surface, *Communication systems, *Communication equipment, Installation in Military facilities, Quality control, Scheduling, Ground support equipment.)

AD-272 957 Div. 5, 6, 30
(TISTP/TL) OTS price $1.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
DIVISION 2. SYSTEMS.
Quarterly progress rept. for 15 Feb 62.
27 Feb 62, 7p.
(Contract AF 19(604)7400)
(AFESD TDR 62-57) Unclassified report

DESCRIPTORS: (*Command systems, Analysis, Communication systems.) (Satellite vehicles, *Tracking.) (*Digital computers, *Mathematical logic, Data transmission systems, Masers, Optics, Solid state physics, Image converter tubes.)

Contents:
Surveillance
Systems analysis
Logical systems
Communications
Data transmission
Intercom
Optics and Infrared
Optical maser studies
Solid state image converter

AD-272 958 Div. 5, 8
(TISTP/FR) OTS price $7.60

Motorola, Inc., Chicago, Ill.
DATA TRANSMISSION INVESTIGATION.
Quarterly progress rept. no. 1, 11 Sep-10 Dec 61,
by J. J. Tsimbidis. 10 Dec 61, 78p. incl. illus.
(Contract DA 36-039-sc-87343, Proj. 3B31-01-001)
Unclassified report

DESCRIPTORS: (*Data transmission systems, Digital systems, *Errors, Measurement.)

A study of digital data transmission over existing military voice communications systems is being made. Error measuring and recording techniques are discussed. The amplitude and delay characteristics of the AN/TCC-7 communications system are included.

AD-272 504 Div. 6, 8, 30
(TISTW/EET) OTS price $2.60

Radiation, Inc., Melbourne, Fla.
TELEMETRY TRANSDUCER HANDBOOK.
Monthly progress rept. no. 9, 15 Jan-15 Feb 62,
by H. F. Fisher, Jr. 21 Feb 62, 24p.
(Contract AF 33(616)8309, Proj. 4107; Continuation of Contract AF 33(616)7466)
Unclassified report

DESCRIPTORS: (*Handbooks, *Telemeter systems, *Transducers, Parts catalogs.) Bibliography, Indexes.

AD-272 527 Div. 6
(TISTW/DLW) OTS price $2.60

Naval Ordnance Lab., Corona, Calif.
INTERPRETATION OF PHOTODETECTOR PARAMETERS,
by J. D. Merriam and W. L. Eisenman. 15 Jan 62,
32p. incl. illus.
(Photodetector series rept. no. 49; NOLC rept. no. 558)
Unclassified report

DESCRIPTORS: (*Infrared detectors, *Infrared photoconductors, Infrared radiation, Detection, Measurement, Signal-to-noise ratio, Sensitivity, Standards, Test methods.)

The parameters and figures of merit used by NOLC in evaluating photodetectors are defined and interpreted. To make the data reported in the NOLC photodetector series of reports more useful, a method is given for determining a photodetector's behavior under conditions other than those measured and reported. (Author)

AD-272 838 Div. 6
(TISTP/GRW) OTS price $8.60

Goodyear Aircraft Corp., Akron, Ohio.
EXPERIMENTAL RESOLUTION IMPROVEMENT RESEARCH.
Phase rept. on Task 2 Demonstration,
by D. G. Corbett. 31 Jan 62, 85p. incl. illus. tables (Rept. no. GER-10268S2)
(Contract DA 44-009-eng-4733, Proj. 8F07-11-001-01)
Unclassified report

DESCRIPTORS: (*Magnetic detectors, *Mine detectors, Design.) (*Optical filters, Correlation techniques, Feasibility studies, Mathematical analysis.) (Cathode ray tubes, Display systems, Photographic recording systems.)

A procedure for accomplishing resolution improvement by two-dimensional inverse filtering of optical signals is described. The fabrication of density patterns to represent a mine detector aperture, distorted scene, and a resolution improvement filter is described. The results of a successful demonstration of this concept of inverse filtering to improve resolution is presented. (Author)

Division 6 - DETECTION

AD-272 861 Div. 6, 8, 22
(TISTP/GRW) OTS price $6.60

Goodyear Aircraft Corp., Akron, Ohio.
EXPERIMENTAL RESOLUTION IMPROVEMENT RESEARCH.
Phase rept., task 4 on Detector Output,
by D. G. Corbett. 31 Jan 62, 57p. incl. illus. tables (Rept. no.GER-10268S3)
(Contract DA 44-009-eng-4733, Proj. 8F07-11-001-01)
Unclassified report

DESCRIPTORS: (*Magnetic detectors, Electromagnetic fields, Magnetic fields, *Mine detectors, Signals, Feasibility studies.) (Magnetic detectors, Signals, Nonlinear systems, Electrical networks, Differentiating circuits.)

A magnetic-induction mine detector suitable for use with an inverse-filtering resolution improvement system is investigated. The results of several tests with a crt for converting the electrical output of the detector to a density pattern are presented. Several coil configurations are investigated to obtain a detector response function similar to the theoretical sensitivity function furnished by ERDL for the Resolution Improvement Program. The response linearity or signal superposition obtained with this type of detector is also investigated. (Author)

AD-272 883 Div. 6, 2
(TISTP/FR) OTS price $6.60

United Research, Inc., Cambridge, Mass.
TURBULENCE MEASUREMENTS AT HIGH ALTITUDES BY SECOND-DIFFERENCE INTERFEROMETRY.
Final rept., 1 July 60-31 Oct 61,
by Dwight W. Batteau, Thomas E. Beling, and Richard H. Spencer. 31 Oct 61, 60p. incl. illus. tables, 3 refs.
(Contract DA 36-039-sc-84963)
Unclassified report

DESCRIPTORS: (Atmosphere, High altitude, Turbulence, Measurement.) (*Interferometers, *Radar.) (Radar transmitters, Radar receivers, Microwaves, Radar antennas, Radar reflectors.)

Second Difference Interferometry, SDI, is a new method for determining the spatial distribution and motion of a pair of radar reflective targets or of an aggregate of radar reflective targets. The basis of SDI is that a pair of radar illuminated targets or a group of radar illuminated targets produce an interference pattern in space that is characteristic of the targets. Motion of the targets causes motion of the interference pattern and hence fixed receiving stations can provide data concerning the interference pattern. Experiments with the system provided a measurement of separation of two 6-inch spheres (carried by a balloon) of 7.2 feet compared to 8.5 feet of actual separation at a range of 6600 feet. Theory for multitarget responses shows that correlation type data processing provides a measure of mean target separation. It is concluded that SDI provides a method of measuring separation between pairs of targets with an accuracy and economy presently unmatched. Application to many meteorological and military problems is obvious. (Author)

AD-272 939 Div. 6, 15
(TISTP/MFA) OTS price $7.60

Advanced Electronics Center, General Electric Co., Ithaca, N. Y.
OPERATIONS RESEARCH ON RECOGNITION.
Final rept. 1 Mar 60-1 Dec 61,
by Robert D. Turner. 1 Dec 61, 73p. incl. illus. 7 refs.
(Contract AF 19(604)6103, Proj. 4691)
(AFCRL 62-52) Unclassified report

DESCRIPTORS: (*Target recognition, *Operations research, *Detection, Feasibility studies.) (Sequential analysis, Statistical analysis, Statistical tests, Mathematical prediction, Linear systems.) Computers.

The work and results of a study program, Operations Research on Recognition, are reviewed. An expository discussion of the methods of statistical decision theory, as applied to the steady-state recognition problem, is presented. An example, designed to illustrate the application of these methods, is discussed in detail, thereby delineating some of the impact of practical operational constraints on a recognition decision scheme. The organization of the flow of data in the general recognition device operating in an action-selection environment is considered. Decision and data-flow diagrams for the major elements and several ancillary elements of a general recognition device are given. Conclusions and recommendations for further efforts are presented, and some estimates are given for the ultimate performance of multiple-stage linear search mechanisms. (Author)

AD-272 979 Div. 6, 8, 12
(TISTW/DLW) OTS price $6.60

Battelle Institute, Frankfurt/Main (Germany).
RECEIVING STATION FOR THE TRANSIT PROGRAM. PHASE II.
Final rept. on Phase 2,
by J. Eitzenberger, J. Hillmann and others.
30 Mar 61, 18p. incl. tables.
(Contract DA 91-591-EUC-1544)
Unclassified report

DESCRIPTORS: (*Satellite vehicles, Navigation, *Doppler tracking, *Doppler navigation, Tracking, *Radio stations, Radio receivers, Very high frequency, Dipole antennas, Magnetic recording systems, Radio equipment, Instrumentation, Installation.) Germany.

A receiving station is described which was designed to measure the doppler effect of signals of TRANSIT satellites. The receiving station allows simultaneous reception of two frequencies of a satellite. The two receivers cover the range between 53,2 and 262 mc including TRANSIT frequencies of 54, 108, 162 and 216 mc, except 324 mc. No measurement tests as the result of satellite passings are reported. The tracking station location does not provide the desired very low noise level. However, useful recordings of satellite signals are possible. (Author)

7. ELECTRICAL EQUIPMENT

AD-272 530 Div. 7, 8, 26
(TISTE/NTM) OTS price $4.60

International Resistance Co., Philadelphia, Pa.
RESISTORS, FIXED FILM TYPE GENERAL PURPOSE.
Quarterly progress rept. no. 9, 1 July-30 Sep 61,
by Jerome G. Burns. 30 Sep 61, 48p. incl. tables.
(Contract DA 36-039-sc-81283)
Unclassified report

DESCRIPTORS: (*Fixed resistors, *Resistors, Production, Processing, *Manufacturing methods.) (Materials, Films, Coatings, Carbon alloys, Oxidation, Inhibition, Molding, Molding materials, Reliability, Tests, Life expectancy.)

Research continued on the fixed film type resistors. The following conclusions were reached: At 175 C no-load, resistive film contributes the bulk of Delta R rather than termination. Performance is related to base range; the higher the base range, the higher the Delta R's. PC-29 overcoat minimizes % Delta R on all base ranges as compared to non-overcoated units. The maximum base range for this resistor will be between 3 and 5 Kilohms. CP40S type termination material is superior to CP40D on units 300 ohms and lower. Silver migration is not a problem with this resistor. The filament cutting, trim-paint and molding operations now operate satisfactorily. The materials used for this resistor do not have the capability of performing at 175 C no-load within specification limits. (Author)

AD-272 542 Div. 7
(TISTM/EJH) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
CYLINDRICAL ALKALINE CELL,
by F. Kh. Nabiullin, S. A. Gantman and others.
14 Feb 62, 2p. incl. illus. (Trans. no. FTD-TT-61-171 of Russian Patent no. 129690, pp. 1-2, 25 Sep 1960)
Unclassified report

DESCRIPTORS: (*Alkaline cells, *Dry cells, *Electrolytic cells, Electrodes, Electrolytes, Design.) (Manganese dioxide electrodes, Anodes (Electrolytic cell), Manganese compounds, Dioxides, Graphite, Alkali metal compounds.) (Cathodes (Electrolytic cell), Zinc.) USSR.

This invention belongs to the class of alkaline cells of a cylindrical shape having an anode made of MnO2, graphite materials and alkalis, and a cathode of pasted Zn. A concentrated electrolyte is placed in the inside cavity of the anode. The proposed alkaline cell is distinctive in that the anode is pressed into a graphite jar and the cathode has the form of a full cylinder provided inside with a metallic sheathe coated on the surface with a solid protective layer of starch paste simultaneously serving as the cell's diaphragm. The cell is assembled in a cylindrical case made of two layers of paper. Between the layers of paper is a polyethylene film which makes it waterproof and impermeable to atmospheric CO2. (Author)

AD-272 651 Div. 7, 26
(TISTW/DLW) OTS price $6.60

General Instrument Corp., Woonsocket, R. I.
PRECISION (BOBBINLESS) RESISTOR REFINEMENT PROGRAM.
Final technical engineering rept., 18 June 59-18 Aug 61,
by Anthony M. Pepe. Oct 61, 42p. incl. illus. tables.
(Contract AF 33(600)39817)
(ASD TR 62-7-974) Unclassified report

DESCRIPTORS: (*Resistors, Wire-winding machines, Insulating materials, Production, Design, Manufacturing methods.)

Precision (bobbinless) wirewound resistors can be quantity-quality manufactured using the unique equipments and production processes developed. The optimized design of the bobbinless resistance element, welded terminations, and the welded, hermetically sealed envelope; provides that the finished resistor will be insensitive to environmentals. Finished units exhibit an ability to survive such rigorous tests as short time overload, salt water immersion cycling, high temperature load life, and thermal shock without an appreciable change in terminal resistance, indicating that exceptionally long operating life can be expected. The process evolved for manufacture, provides for maintenance of all critical design parameters of the unit and through use of the semi automatic equipments reduces operator introduced variations in end product performance to a minimum. (Author)

AD-272 666 Div. 7, 14, 17
(TISTM/GEC) OTS price $3.60

Radio Corp. of America, Somerville, N. J.
ORGANIC DEPOLARIZED PRIMARY BATTERIES.
Quarterly progress rept. no. 1, 15 June-14 Sep 61,
by G. S. Lozier, J. B. Eisen, and R. J. Ryan.
14 Sep 61, 27p. incl. illus. table, 9 refs.
(Contract DA 36-039-sc-87243, Proj. 3A-99-09-002)
Unclassified report

DESCRIPTORS: (*Primary batteries, Wet cells, *Magnesium alloys, *Nitro radicals, *Organic compounds, Theory, Electrochemistry.) (Cathodes (Electrolytic cell), Carbon, Benzenes, Nitro radicals, Heterocyclic compounds, Pyridines, Pyrimidines, Furan, Thiophenes.) (Electrolytes, Magnesium compounds, Perchlorates, Bromides.) (Anodes (Electrolytic cell), Magnesium alloys.)

A program was started to enlarge the scope of m-dinitrobenzene-C studies to determine the fundamental properties of the C affecting cell performance. The development of a practical Mg m-DNB cell is dependent upon gaining a thorough understanding of the function of carbon in the nitro organic cathode. Also included will be a study to determine the mechanism of the nitro reduction reaction. (Author)

AD-272 752 Div. 7, 25
(TISTM/GEC) OTS price $4.60

General Atomic Div., General Dynamics Corp., San Diego, Calif.
RESEARCH ON CESIUM-VAPOR CELLS EMPLOYING CARBIDE

Division 7 - ELECTRICAL EQUIPMENT

CATHODES.
Yearly technical summary rept., 1 Feb 61-31 Jan 62,
by R. W. Pidd, H. L. Garvin and others. Feb 62, 44p. incl. illus. 19 refs. (Rept. no. GA-2900)
(Contract Nonr-319300, Proj. 94.00)
Unclassified report

DESCRIPTORS: (*Power supplies from *Thermionic emission, *Cesium, Vapors.) (Cathodes, Uranium compounds, Zirconium compounds, Carbides, Anodes, Copper.) (Temperature, Measurement, Ions, Electricity, Production.) Theory, Design, Diodes, Thermoelectricity.

The performance of Cs vapor thermionic cells employing carbide emitters was studied. Vacuum emission measurements were made on a series of samples consisting of polycarbides of U and Zr. Certain carbide samples were incorporated into Cs cells and studies were made of the electrical output characteristics. Results indicated that the cells operate in a discharge mode for Cs pressures exceeding 0.1 mm Hg and that maximum power output decreases linearly as the interelectrode spacing increases. Observations were made of the effect of Cs adsorption on carbide and refractory metal emitter materials. (Author)

AD-272 753 Div. 7
(TISTW/RD) OTS price $2.25

General Atomic Div., General Dynamics Corp., San Diego, Calif.
HIGH-TEMPERATURE, VAPOR-FILLED THERMIONIC CONVERTER.
Technical rept. I for 1 July 60-30 June 61 on Development of a High-temperature, Vapor-filled Thermionic Converter,
by F. Carpenter, J. Dunlay and others. Dec 61, 79p. incl. illus. tables, 5 refs. (Rept. no. GA-2530)
(Contract AF 33(616)7422, Proj. 3145)
(ASD TR 61-513) Unclassified report

DESCRIPTORS: (*Electric power production, *Power supplies, Thermionic emission, Design, Manufacturing methods.) (*Thermionic emission with Uranium compounds and Carbides, Zirconium compounds.) (Power supplies for Power reactors for Space flight.) Vacuum systems.

The results are described of the design, fabrication, and initial test portions of the program on high-temperature, vapor-filled thermionic converters. Problems associated with the design and operation of a thermionic converter employing a uranium carbide-zirconium carbide emitter and a high-temperature collector were investigated. The object was to advance the development of a thermionic converter exhibiting high power density, improved efficiency, and long life for application with a high-temperature nuclear reactor for space-flight electric power generation. (Author)

AD-272 795 Div. 7, 8
(TISTE/NTM) OTS price $10.10

International Resistance Co., Philadelphia, Pa.
RESISTORS, FIXED, NON-WIREWOUND (POWER TYPE).
Final engineering rept., 30 Apr 58-31 May 61,
by Dorothy M. Hoffman and William Leopold.
31 May 61, 1v. incl. illus. tables.
(Contract DA 36-039-sc-75973)
Unclassified report

DESCRIPTORS: (*Fixed resistors, Production, Manufacturing methods, Processing.) (Temperature, Moisture, Shock, Resistance, Life expectancy, Tests, Test facilities, Metal films, Resistors.)

A manufacturing process and a pilot facility were established for the production of power metal film resistors which exceed the performance level of MIL-R-11804B (modified). Major effort was devoted to obtaining a resistor capable of withstanding a 350 C hot spot temperature (characteristic T). The production process was established and tests performed. The major problem was obtaining suitable substrates for the RD37 and RD39 sizes. After thoroughly investigating the problem, it was decided that this difficulty was insurmountable at this time; thus these two sizes were dropped from the contract. Other problems were: (1) the selection of assemblies resistant to high temperatures; and (2) the determination of a suitable metal film. These were solved and a complete production process was established. (Author)

AD-272 875 Div. 7, 6, 30
(TISTW/JRG) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
A TIME SHARING SWITCH FOR SPACECRAFT TELEMETRY SYSTEMS,
by William A. Leavy. Mar 62, 10p. incl. illus.
(NASA Technical note D-1172)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1172.

DESCRIPTORS: *Time switches, *Commutators for *Telemeter systems in *Satellite vehicles.

Where there are low signal levels or when long life is required in a spacecraft's telemetry system, the application of mechanical commutators usually is not considered because of the inherent wear and the resultant electrical degradation which ordinarily is present in mechanical systems. In the development of the TIROS infrared instrumentation, a mechanical commutator capable of time-sharing low signal levels for long periods of time was designed. This mechanism requires little driving torque, is small in size, and is light in weight. A description is given of the commutator, and its feasibility is demonstrated. Possible adaptations which will enable it to satisfy various requirements are indicated. (Author)

8. ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-272 534 Div. 8
(TISTE/NTM) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A FERRITE UHF PHASE-SHIFTER,
by F. P. Nifant'yeva. 1 Feb 62, 3p. incl. illus. 4 refs. (Trans. no. FTD-TT-62-38 from Pribory i Tekhnika Eksperimenta, no. 1:pp. 101-102, 1961)
Unclassified report

DESCRIPTORS: (*Phase shifters, Ultra high frequency, Ferrites, Magnetic fields, USSR.) (Transmission lines, *Microwave equipment, *Ferrite cores, *Coaxial cables, Helixes, Dielectrics, Attenuation, Radio signals, Radio transmitters, Radio receivers, Measurement.)

A description is given of a uhf phase-shifter which varies the phase of an output signal from 0 to 360 degrees by varying the longitudinal magnetic field applied to the ferrite from 0 to 250 oersteds. The phase-shifter is of simple design and has comparatively small dimensions. It consists of a coaxial spiral line with the ferrite inside it. The input and output of the line are made in the form of a 75-ohm coaxial cable plug. Inside the spiral line are two ferritic cores. A two-layer winding of PEL-1.25 wire in a water jacket is wound on the outer cylinder of the coaxial spiral line for the purpose of creating a magnetic field. The line attenuation and the phase shift were measured at a frequency of 150 Mc. The characteristics of the phase-shifter are such that when the magnetic field varies from 0 to 250 oersteds, the phase shift of the signal amounts to 360 degree, and the attenuation decreases from 12 to 3.2 db. (Author)

AD-272 536 Div. 8, 30
(TISTP/MFA) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A DEVICE FOR OBTAINING THE QUOTIENT FROM THE DIVISION OF TWO PULSES,
by R. G. Karpov. 15 Feb 62, 3p. incl. illus. (Trans. no. FTD-TT-61-460 of Soviet Patent no. 130688:pp. 1-3, 13 May 59)
Unclassified report

DESCRIPTORS: (Instrumentation for *Information theory, Simulation and *Coding, *Inventions.) (Servomechanisms, Pulse generators, Electrical networks, Transducers, Oscillators.) USSR.

There are devices for obtaining the quotient from the division of two pulse trains simulating the continuous change of physical values in the form of the frequency change of a pulse sequence. However, when using this method of simulation, the preliminary operation of converting frequency-pulse information into direct current for machines of continuous operation, or of binary coding of instantaneous information values for discrete calculating devices, is certainly applicable. Obviously, information conversion in both cases will be carried out with a certain error, directly affecting the accuracy of the result of the operation of the machine as a whole. The device suggested here carries out division, not requiring preliminary conversions, and puts out a new pulse train whose frequency is directly proportional to the change in one physical value (dividend) and inversely proportional to the change in another (divisor), which makes it possible to use the device directly with transducers. (Author)

AD-272 541 Div. 8
(TISTE/NTM) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A BROADBAND DIRECTIONAL ANTENNA,
by V. D. Kuznetsov and V. K. Paramonov. 14 Feb 62, 2p. incl. illus. (Trans. no. FTD-TT-61-173 of Soviet Patent no. 131793, pp. 1-2, 19 Dec 59)
Unclassified report

DESCRIPTORS: (*Dipole antennas, Broadband, Coupled antennas, Impedance matching, Antenna chokes, Television antennas, Ultra high frequency, *Antennas, USSR.)

A study was made of a broadband directional antenna in the form of a periodic structure. To obtain good directional characteristics in free space as well as near the Earth's surface and to be matched over a wide frequency range in a structurally simple device, the antenna is built as a flat system of balanced dipoles fed by a balanced line. The length of the legs of the dipoles and the spacing between the dipoles varies in proportion to the distance from the beginning of the antenna, and each successive dipole is excited in antiphase relative to the previous one. (Author)

AD-272 553 Div. 8
(TISTW/RD) OTS price $19.75

Tennessee U. Engineering Experiment Station, Knoxville.
THE THEORY AND DESIGN OF CIRCULAR ANTENNA ARRAYS,
by J. D. Tillman. 10 Jan 62, 292p. incl. illus. 27 refs. (Scientific rept. no. 6) (Contract AF 19(604)4967, Proj. 4600) (AFCRL 62-63)
Unclassified report

DESCRIPTORS: (Theory, Design, *Antennas, Rings.)

Comprehensive treatments of the theory of concentric-ring antenna arrays, and of the application of the theory of circular arrays to various antennas are given. The boundary value problem describing the currents and voltages on concentric-ring arrays is formulated in terms of simultaneous integral equations, and an approximate solution is obtained. The radiation patterns resulting from these currents are then found. Succeeding chapters cover parasitic circular arrays, corner reflector arrays, circular receiving arrays, the use of folded elements in circular arrays, and supergain in circular arrays. An electronic scanning circular array is described in considerable detail. (Author)

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-272 598 Div. 8, 15
(TISTP/TL) OTS price $2.60

Brown U., Providence, R. I.
ON THE PROBLEM OF ANTENNA BEAM BROADENING DUE TO ATMOSPHERIC TURBULENCE,
by Carlos M. Angulo and Jacobo Farber. Nov 61, 17p. incl. illus. 7 refs. (Scientific rept. no. AF 4561/14)
(Contract AF 19(604)4561)
(AFCRL-62-4) Unclassified report

DESCRIPTORS: (*Antennas, *Antenna radiation patterns, Atmospherics, Turbulence.) (*Microwaves, Propagation, Refractive index, Geometry, Optics.) (Integral transforms, Partial differential equations, Statistical functions, Algebras.)

In this analysis, random fluctuations of both amplitude and phase are considered and formulas for the mean square broadening are developed under these conditions, the geometrical optics approximation being used. Both one and two-dimensional antennas are studied and a criterion for resolution capabilities is established. (Author)

AD-272 627 Div. 8
(TISTE/NTM) OTS price $2.60

Watkins Johnson Co., Palo Alto, Calif.
FEASIBILITY STUDY OF A HIGH-POWER S-BAND KLYSTRON.
Final rept. 1 Nov 59-15 Dec 61,
by R. D. Frost and O. T. Purl. 1 Jan 62, 22p. incl. illus. table.
(Contract Nonr-302000, Proj. NR 373-430)
Unclassified report

DESCRIPTORS: (*Klystrons, S band, Electron tubes, *Microwave amplifiers, *Power amplifiers, Feasibility studies.) (Electrodes, *Electron guns, Optics, Focusing, Solenoids, Magnetic fields, Electron beams, Cathodes (Electron tubes), Anodes (Electron tubes), Heating, Modulation, Design, Tests, Test equipment.)

A feasibility study of a high-power S-band klystron was concluded. During this program a perveance 1.6 x 10 to the -6th power gun was developed which is suitable for use in a high power klystron. The beam from this gun is well formed and should focus with less than 1% circuit interception. Thus peak heating of the drift tube or cavity ferrules because of current interception will not be a major limitation in the design of the long pulse klystron under study. This gun has sufficient beam area convergence and focus electrode-anod spacing to operate well with the klystron parameters outlined. The non-intercepting gridded gun capable of high values of mu, developed under this study, represents a significant advance in the design of super power tubes. The reduction in weight and cost of the modulator possible through the use of such a grid, rather than a mod-anode, should be greater than 5:1. (Author)

AD-272 633 Div. 8, 26
(TISTE/NTM) OTS price $3.60

Motorola, Inc., Phoenix, Ariz.
INDUSTRIAL PREPAREDNESS MEASURE 400 MC, 300 MW POWER TRANSISTOR.
Quarterly rept. no. 2, 23 Sep-23 Dec 61 on Step 1,
by R. A. Jacobs and J. E. Muschinske. 23 Dec 61, 14p. illus.
(Contract DA 36-039-sc-85975)
Unclassified report

DESCRIPTORS: (*Transistors, Microwave equipment, Radiofrequency power, Ultra high frequency, Production, *Manufacturing methods, Military requirements, Processing, Specifications.) (Transistors, Semiconductors, Germanium, Life expectancy, Packaged circuits, Design.)

Contents:
Device design
  Mechanical and electrical design
Process technology
  Material preparation
  Base diffusion
  Oxide masking
  Emitter diffusion
  Contact metallizing
  Mesa formation
  Scribing
  Fabrication and packaging
Electrical characteristics and test data
  High frequency performance
  High frequency parameters
  D.C. transistor characteristics
  Life tests

AD-272 658 Div. 8
(TISTW/DLW) OTS price $4.60

Electronics Research Lab., U. of Calif., Berkeley.
NOISE FIGURE OF CROSSED-FIELD AMPLIFIERS,
by J. F. Rando. 13 July 61, 41p. incl. illus. 15 refs. (Series no. 60, Issue no. 383)
(Contract DA 36-039-sc-85278)
Unclassified report

DESCRIPTORS: (*Backward-wave amplifiers, *Magnetrons, Radiofrequency amplifiers, Electromagnetic waves, Wave transmission, Electron guns, Electron beams, Transformations (Mathematics), *Noise (Radio), Perturbation theory, Matrix algebra, Integral equations, Theory, Measurement.)

The noise figures of forward and backward-wave crossed-field amplifiers are derived. The velocity fluctuations at the cathode are transformed to the slow-wave structure using a modification of the Llewellyn-Peterson equations. Matching the boundary conditions between the beam and the circuit, the magnitudes of the waves excited are obtained. Noise figure measurements were made using a backward-wave amplifier. Since poor agreement is found between the theoretical and experimental gain, it is perhaps premature to compare the noise figures. The comparisons made showed that the experimental noise figures were several db lower than the theoretical values for the corresponding cases. (Author)

AD-272 659 Div. 8
(TISTW/RD) OTS price $3.60

Electronics Research Lab., U. of Calif., Berkeley.
HIGH FREQUENCY NOISE PHENOMENA IN THE SPACE-CHARGE-LIMITED DIODE,

by M. A. Pollack and J. R. Whinnery. 2 Aug 61, 27p. incl. illus. table, 9 refs. (Series no. 60, Issue no. 387)
(Contract DA 36-039-sc-85278, Proj. 3A99-13-001-05)

Unclassified report

DESCRIPTORS: (Numerical analysis of High frequency, *Noise (Radio) at Cathodes (Electron tubes).) (Numerical methods and procedures for Analysis of Noise (Radio) in *Diodes.) (Diodes, Space charges, Thermionic emission.)

Whinnery's approximate analysis of the high-frequency effects of the potential minimum on noise is developed in greater detail. Additional numerical computations are presented to evaluate the effects of several parameters. General agreement is found between these results and those of other approximate analyses and more exact Monte Carlo studies, although more detailed agreement, as in the case of the Tien dip, is not found. (Author)

AD-272 663 Div. 8, 25
(TISTW/RD) OTS price $7.60

Ionosphere Research Lab., Pennsylvania State U., University Park.
STUDIES OF THE EQUATORIAL IONOSPHERE USING THE FARADAY EFFECT ON SATELLITE RADIO TRANSMISSIONS.
Rept. on Satellite Proj.,
by L. J. Blumle. 1 Mar 61, 67p. incl. illus. tables, 18 refs. (Scientific rept. no. 156)
(NASA Grant NsG-114-61)

Unclassified report

DESCRIPTORS: (Analysis, *Ionosphere, Magneto-optic rotation, *Radio transmission, *Satellite vehicles.) (Measurement, Magneto-optic rotation, Radio signals, Satellite vehicles.) (Measurement, Density, Electrons, Ionosphere.)

The Faraday rotation effect on satellite signals has been used to determine the electron content of the ionosphere near the magnetic equator. The ambiguity in the total number of rotations along the ray path has been resolved by observing the satellite when the total number of rotations along the ray path is essentially zero. The rotations of the plane of polarization are then counted from this point and used to determine total electron content. The equipment used to record and analyze the Faraday effect is described. A measurement of the dip angle of the geomagnetic field at about 400 km above the magnetic equator is described. Observations of the total electron content of the ionosphere made over a 4-month period are compared with values obtained from the dispersive doppler method. The total electron content results are compared with those obtained using a Chapman extrapolation for the electron density profile above the electron density peak. (Author)

AD-272 675 Div. 8, 30
(TISTP/FR) OTS price $1.60

Aeronautical Electronic and Electrical Lab., Naval Air Development Center, Johnsville, Pa.
THIN MAGNETIC FILM MEMORY PROGRAM.
Progress rept.,
by S. Greenberg. 12 Jan 62, 18p. incl. illus.
(Rept. no. NADC-EL-61102)

Unclassified report

DESCRIPTORS: (Memory devices, *Magnetic tape, *Thin films.) (*Metal films, Magnetic properties.)

The NAVAIRDEVCEN has been making laboratory studies of thin magnetic films for over a year. The areas of work have included the preparation of films, magnetic measurements, domain studies, physical measurements, and electronic driving and sensing circuitry. Problems currently faced are high values of saturation magnetization field, non-uniformity, ragged edges, and driving circuitry limited to a repetition rate of one or two megacycles. (Author)

AD-272 699 Div. 8, 25, 30
(TISTW/EET) OTS price $1.60

Contronics, Boston, Mass.
SMALL DIGITAL PANEL METER.
Quarterly progress rept. no. 2.
1961, 15p. incl. illus.
(Contract NObsr-85462)

Unclassified report

DESCRIPTORS: (Design of *Voltmeters, Shipborne, *Display systems, *Analog-to-digital converters, Semiconductors, Transistors, Diodes.) (Subminiature electronic equipment, Electronic circuits, Printed circuits, Packaging, Trigger circuits.)

Progress is reported on the design of a field effect digital voltmeter. The readout device and the field were established, and it remains to determine the best conversion matrix for obtaining the desired accuracy. The cost of the meter will be determined primarily by the conversion array which requires microminiature components. The final design decisions will be made on the basis of the work outlined and results of future investigations. (Author)

AD-272 757 Div. 8
(TISTW/RD) OTS price $1.10

Lincoln Lab., Mass. Inst. of Tech., Lexington.
THE EFFECT OF APPROXIMATION ERRORS IN A GENERAL CLASS OF MATCHED FILTER DETECTORS,
by Morris J. Levin. 13 Feb 62, 7p. 7 refs.
(Rept. no. 34G-3)
(Contract AF 19(604)7400)
(ESD-TDR-62-55) Unclassified report

DESCRIPTORS: (Deterioration in Signal-to-noise ratio of *Radiofrequency filters, *Detectors.) (Errors in Radiofrequency filters, Detectors.)

The deterioration in signal-to-noise ratio at the output of a matched filter detector caused by approximation errors is expressed in terms of the normalized integrated squared difference between the matched and approximating impulse responses. The result is extended to a more general class of quadratic processors for detection of random signals in noise. It is also applied to filters used for signal arrival time estimation. (Author)

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-272 760 Div. 8
(TISTW/DLW) OTS price $11.00

Linfield Research Inst., McMinnville, Oreg.
RESEARCH ON FIELD EMISSION CATHODES.
Rept. on Research on Particle Physics of Electronic Components,
by E. E. Martin, F. M. Charbonnier and others.
Jan 60, 135p. incl. illus. refs.
(Contract AF 33(616)304, AF 33(616)3247, AF 33(616)3851 and AF 33(616)5404, Proj. 4152)
(WADD TR 59-20) Unclassified report

DESCRIPTORS: (*Cathodes (Electron tubes), *Field emission, Measurement, Theory.) (Cold cathode tubes, Electron tubes, Tetrodes, Microwave equipment, Electron optics, Tungsten, Materials, Stability, Electrolytic polishing, Design, Surface properties, Crystal structure, Electrical properties, Measurement.) (Vacuum systems, Aluminum compounds, Silicates, Glass, Electron tubes.)

Design data are presented which allow simple prediction of the electrical performance of field emission cathodes from a knowledge of cathode geometry, work function, and position relative to the tube anode. A theoretical treatment of energy exchange phenomena associated with the emission is given. Use of the field emission cathode in voltage regulation and rectification circuits, electron optical applications, and microwave devices is discussed. Factors affecting the electrical stability of the emission are outlined, and techniques which, through improvement of emitter environment, resulted in betterment of stability by 5 orders of magnitude and stable 1000 hour emission of several milliamperes of dc current are reported. Properties of a number of emitting surfaces are discussed. The electrochemistry of tungsten and its application in the fabrication of field emission tips are treated. Associated techniques are reported which include: (1) the working of alumino-silicate glasses, (2) methods used for achievement of ultra-high vacuum, and (3) controlled re-orientation of tungsten crystals by floating zone melting. (Author)

AD-272 775 Div. 8, 25
(TISTW/DLW) OTS price $3.60

David Sarnoff Research Center, Princeton, N. J.
RESEARCH IN ELECTRON EMISSION FROM SEMICONDUCTORS.
Quarterly rept. no. 5, 1 Oct-31 Dec 61,
by R. E. Simon, E. K. Gatchell and others.
31 Dec 61, 36p. incl. illus. 6 refs. (Rept. no. 13)
(Contract DA 36-039-sc-87388, Proj. 3A99-13-001-01)
Unclassified report

DESCRIPTORS: (*Semiconductors, *Thermionic emission, *Photoemission, Field emission, Surface properties, Conductivity, Crystal structure, Luminescence, Measurement.) (Crystals, Silicon, Cesium, Tungsten, Argon, Diffusion, Surfaces, Thickness, Processing, Preparation.)

Progress is reported in the preparation and evaluation of large area hot electron emitters of silicon. Diffusion techniques were used to prepare p-n junction emitters with n-regions 500-1000 Angstroms thick. Surface conductance, luminescence, and electron emission were used to evaluate the devices. A correlation was observed between emission and luminescence. However, large emission currents were not observed because of the high electron affinity of these devices. Measurements were made which indicate that argon-bombardment may be useful for producing a favorable surface and for reducing the thickness of the surface n-region. Measurements of the sticking coefficient of cesium on tungsten are reported. (Author)

AD-272 777 Div. 8
(TISTW/DLW) OTS price $8.60

Sperry Gyroscope Co., Great Neck, N. Y.
FLIGHT TEST EVALUATION OF FLUSH MOUNTED LUNEBERG LENS ANTENNA FOR PWI/CAS SYSTEM.
Final engineering rept.
Dec 61, 1v. incl. illus. tables, 5 refs. (Rept. no. CA-4283-0196)
(Contract FAA/BRD-190)
Unclassified report

DESCRIPTORS: (*Slot antennas, *Lens antennas, *Airplane antennas, *Radar beacons, Airborne, X band, Identification systems, Commercial planes, Aviation safety, Installation, Effectiveness, Antenna radiation patterns, Flight testing.)

The operation of the Pilot Warning Instrument/Collision Avoidance System (PWI/CAS) is based on a unique dual antenna. This unit consists of a directional scanning antenna (Luneberg lens) and an omnidirectional antenna combined in a flush mounted assembly. Two modified APN-121 dual antennas were flight tested to determine the adequacy and suitability of this type of antenna for the PWI/CAS system. Two FAA aircraft of the JC-131 type were fitted with the modified antennas. A compatible X-band interrogator (APW-18) and a transponder (APQ-16) were used to provide signal sources and signal detectors. The communication coverage volume provided by the two antennas was determined by flying the aircraft towards each other in a series of non-collision and collision courses. The results of the flight test program demonstrate that the dual antenna is both adequate and suitable for the PWI/CAS. (Author)

AD-272 791 Div. 8, 22
(TISTW/JRG) OTS price $3.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
DEVELOPMENT OF BROAD-BAND ELECTROMAGNETIC ABSORBERS FOR ELECTRO-EXPLOSIVE DEVICES.
Monthly progress rept., 1-31 Dec 61,
by Paul F. Mohrbach and Robert F. Wood.
31 Dec 61, 25p. incl. illus. tables (Rept. no. P-B1857-6)
(Contract N178-7913)
Unclassified report

DESCRIPTORS: (*Electric detonators, *Electric igniters, *Radiofrequency attenuators, Radiofrequency, Electromagnetic waves, Hazards, Broadband, Absorption, Attenuation, Measurement, Materials, Design.) Ferrites, Iron compounds, Carbonyl radicals, Powders, Dielectrics, Radiofrequency filters, Phosphors, Luminescent materials, Photosensitivity, Resistors.

Investigations are being conducted to determine the effect of electromagnetic radiation upon electroexplosive components. It is indicated that the best solution would be to incorporate an RF attenuator (a broad-band absorber) within the item to be protected, plugging the leak

which exists in the natural shield provided by the metal case in which most electroexplosive components are contained. Included in the scope of the work are the following: (1) Fundamental studies of the important characteristics of RF attenuator materials; (2) Practical optimization of materials, including improvement of voltage breakdown characteristics, dc resistance, mechanical strength, as well as improved attenuation; (3) Evaluation of materials (such as ferrites) to determine if a material superior to the carbonyl iron can be found; and (4) Study of the effects of configuration and geometry upon attenuation. (Author)

AD-272 806 Div. 8, 25
(TISTE/CDM) OTS price $6.60

Stanford Electronics Labs., Stanford U., Calif.
SOLID-STATE ELECTRONICS RESEARCH.
Consolidated quarterly status rept. no. 12, 1 July-30 Sep 61.
30 Sep 61, 53p. incl. illus. refs.
(Contract Nonr-22531, Nonr-22524 and others.)
Unclassified report

DESCRIPTORS: (*Solid state physics, *Electronics, *Scientific research.) (*Microwave oscillators, *Microwave amplifiers, *Masers, Switching circuits, Mathematical analysis, *Electronic switches.) (*Semiconductors, Lattices, Ions.) (Infrared spectroscopy, Extremely high frequency, Masers, Parametric amplifiers.) (X band, Cavity resonators.) (Semiconductors, Silicon, Germanium, Gallium compounds, Arsenides.) (Digital systems, Data processing systems, Solid state physics.)

AD-272 849 Div. 8, 7
(TISTW/JRG) OTS price $3.60

Westinghouse Electric Corp., Pittsburgh, Pa.
HEAT DIODE CONVERTER.
Interim scientific rept. no. 3, 1 Nov 61-31 Jan 62.
20 Feb 62, 16p. illus.
(Contract AF 33(616)8262)
Unclassified report

DESCRIPTORS: (*Thermoelectricity, Electric power production, Power supplies.) (Electrical properties, Molybdenum, Cesium, *Diodes.) (*Thermionic emission, *Plasma physics, Cesium, Discharge tubes.) (Thermionic emission, Molybdenum, Cathodes (Electron tubes), Evaporation in Cesium, Vapors.) (Electrons, Reflection from Cesium, Coatings, Thin films.) (Cesium, Vapors, Thermal conductivity.)

Contents:
Current voltage characteristics of a molybdenum cathode in variable spacing cell
Thermionic emission from materials in cesium vapor
Evaporation of molybdenum in the presence of cesium vapor
Electron reflection from cesium coated surfaces
Cesium vapor thermal conductivity

AD-272 878 Div. 8, 26
(TISTW/RD) OTS price $2.60

Pacific Semiconductors, Inc., Lawndale, Calif.
PRODUCTION ENGINEERING MEASURE. TRANSISTOR, VHF, SILICON, POWER (5W-70MC).
Quarterly rept. no. 2, 1 Sep-30 Nov 61,
by B. D. Gray, H. Hontz and others. 30 Nov 61, 19p. tables (PSI rept. no. TE 4000:15-Q-2)
(Contract DA 36-039-sc-85960)
Unclassified report

DESCRIPTORS: (*Production, Engineering, Analysis for Production of Very high frequency, Silicon, *Transistors.) *Manufacturing methods, Test equipment for Production of Transistors.

Engineering test sample transistors fabricated according to the initial device design indicate that the design is essentially correct and that only minor modifications are required. Development of fabrication and test equipment, and the establishment and operation of the pilot production line is proceeding according to schedule. Difficulties are being encountered with the procurement of packages. (Author)

AD-272 887 Div. 8
(TISTW/RD) OTS price $2.60

Airborne Instruments Lab., Inc., Deer Park, Long Island, N. Y.
DEVELOPMENT OF TUNABLE C-BAND REACTANCE AMPLIFIERS.
Quarterly rept. no. 3, 1 Sep-30 Nov 61,
by J. Kliphuis and J. J. Whelehan. Jan 62, 16p. illus. 4 refs. (AIL rept. no. 1124-I-3)
(Contract DA 36-039-sc-87405, Proj. 3G19-06-001-03)
Unclassified report

DESCRIPTORS: (Design of C band, *Microwave amplifiers, *Tuned amplifiers.) (Theory of Ultra high frequency, Amplifiers.) (*Diodes using Silicon, Gallium compounds, Arsenides for use in C band, Amplifiers.)

Methods of tuning three C-band reactance amplifiers simultaneously are evaluated from an operational point of view. Tuning the amplification bandwidth by varying the idler frequency with a dc bias voltage is considered the most practical method. The performance of epitaxial and non-epitaxial silicon and gallium-arsenide diodes in a tunable amplifier is evaluated. A special Microwave Associates epitaxial silicon diode proved to be the most suitable for an amplifier using a variable idler frequency. The performance of three proto-type amplifiers, each using one of the tuning methods, is evaluated. The gain-bandwidth product and the noise figure of a UHF amplifier are computed. The UHF amplifier configuration is similar to that of the C-band amplifiers, but double-tuning techniques are used to obtain the required gain-bandwidth product. (Author)

AD-272 897 Div. 8, 26
(TISTW/RD) OTS price $1.60

Transitron Electronic Corp., Wakefield, Mass.
PRODUCTION ENGINEERING MEASURE ON SILICON HIGH FREQUENCY POWER TRANSISTOR.
Quarterly rept., 1 Oct-31 Dec 61,
by David O'Brien. 31 Dec 61, 14p. incl. illus. tables.
(Contract DA 36-039-sc-81286)
Unclassified report

DESCRIPTORS: (*Production, Engineering, Analysis for Production of High frequency, Silicon, *Transistors.) (*Manufacturing methods for Production of Transistors.)

The failure to introduce back-diffusion into the process with a good yield led to a major change in the process. Work was carried out on the pull-back method of creating a N N junction in silicon which is described. Transistors made from this process have been successful in meeting the Vce sat in general. However as in the back-diffused units other parameters, especially Ico, have suffered. (Author)

AD-272 898 Div. 8
(TISTW/RD) OTS price $5.60

Westinghouse Electric Corp., Baltimore, Md.
IR BLOCK DEVELOPMENT.
Interim rept. no. 1, 3 Oct 61-3 Jan 62, by C. P. Hoffman, D. A. Deardorf, and W. N. Jones. 31 Jan 62, 58p. incl. illus. tables. (Contract AF 33(657)7111)
Unclassified report

DESCRIPTORS: (Design, Manufacturing methods of Direct current, *Amplifiers and *Audio-frequency oscillators using Transistors for *Infrared equipment.)

The objective of this program is to develop the designs for, and to fabricate by means of molecular engineering, a d-c amplifier and an audio or nutation oscillator. The oscillator will have quadrature outputs. These units are intended for use in an IR system, and in other applications. The emphasis on the d-c amplifier was on transistor development, both unipolar and bipolar, and the circuit design has not been set at this time. It well be necessary to base the design on the performance of the transistors produced due to rigid specifications which must be met, especially the required stability. Therefore, when it is determined which of the transistor types or combinations thereof will furnish the best over-all performance, the circuit configuration will be finalized. A design for the nutation oscillator was completed and its analog was tested. Fabrication of the transistors and passive components has been initiated. The oscillator design is based on mixing the outputs of two high frequency crystal controlled oscillators to obtain a beat frequency at the desired audio frequency. (Author)

AD-272 912 Div. 8, 15
(TISTP/MFA) OTS price $7.60

Electronics Research Lab., U. of Calif., Berkeley.
NONLINEAR ANALYSIS OF SINUSOIDAL OSCILLATORS, by G. H. Wilson. 18 Dec 61, 74p. incl. illus. tables, 24 refs. (Series no. 60, Issue no. 420) (NSF Grant G-12142)
Unclassified report

DESCRIPTORS: (Analysis of Nonlinear systems, *Electronic equipment, *Oscillators, Transistors, Diodes.) (*Electrical networks, Resistance, Coils, Vacuum tube amplifiers.) (*Harmonic analysis, Bessel functions, Transformations (Mathematics), Fourier analysis, Differential equations.)

This study was undertaken for the purpose of (1) applying and extending the techniques of nonlinear analysis (theorems and approximations) specifically to sinusoidal oscillators to predict the existence of oscillations (starting condition) and determine the amplitude and frequency of existing oscillations, and (2) developing by analysis and experiment a nonlinear model for the transistor which could be analyzed simply yet give meaningful results and aid in the design of transistor oscillator circuits to meet predetermined specifications. Sinusoidal oscillator here means one in which some voltage, or current, or linear combination of voltages and currents is very nearly sinusoidal. (Author)

AD-272 916 Div. 8
(TISTW/RD) OTS price $9.10

Electrical Engineering Research Lab., U. of Illinois, Urbana.
NARROW-BAND MATCHED-CHANNEL IF AMPLIFIERS, by Richard Frank Donnelly. 30 Nov 61, 103p. incl. illus. 36 refs. (Technical rept. no. 16) (Contract Nonr-183402, Proj. NR 371-161)
Unclassified report

DESCRIPTORS: (Synthesis of Electronic circuits, Design for Narrowband, *Intermediate frequency amplifiers.) Tuned amplifiers, Tuned circuits, Band-pass amplifiers.

Research concerns the synthesis of a general circuit design for narrow-band matched-channel IF amplifiers with improved bandpass characteristics. Previously twin-channel receivers employing cascaded single-tuned IF stages to develop the bandpass characteristics were successfully employed for direction finding. Single-tuned stages have the advantage of a simple matching procedure; and, since accurate and simple-matching is a prime requirement, double-tuned and higher-order stages have not been employed in general. Ideal specifications are proposed. Then classical approximations to the ideal frequency response are reviewed. Next, practical circuits realizing these classical frequency responses are discussed. Finally, alignment and matching procedures are developed for the corresponding circuit solutions. (Author)

AD-272 995 Div. 8
(TISTW/RD) OTS price $1.60

ITT Federal Labs., Fort Wayne, Ind.
PRODUCTION ENGINEERING MEASURE FOR TYPE FW-202 BARRIER GRID STORAGE TUBE.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 61, by J. M Abraham. 26 Jan 62, 16p. incl. illus. table (Serial no. 3184)
(Contract DA 36-039-sc-85967)
Unclassified report

DESCRIPTORS: *Production, Engineering, Analysis for Production of *Storage tubes.

The electron-beam evaporator was installed and copper screens were thickened. The combination of a new frit and a new processing technique resulted in a bubble-and-pit-free dielectric layer. One test gun was evaluated and produced a 5-mil spot at a beam current of 14 microamps. The investigation of the low temperature alloys as bonding agents continued.. (Author)

9. FLUID MECHANICS

AD-272 577 Div. 9
(TISTP/WH) OTS price $4.60

Naval Ordnance Test Station, China Lake, Calif.
EXPERIMENTAL DETERMINATION OF PRESSURE DISTRIBUTION ON A SPHERE DURING WATER ENTRY,
by C. R. Nisewanger. 27 Oct 61, 38p. incl. illus. 9 refs. (NOTS TP 2806)
(NAVWEPS rept. no. 7808) Unclassified report

DESCRIPTORS: (*Spheres, *Water entry, *Load distribution.) (Hydrodynamics, Drag, Fluid flow.)

The pressure distribution on a 12-inch-diameter sphere during vertical water entry at 23.5 fps was determined by direct pressures versus time measurements at several points on the sphere. From these data, pressure versus angle from the stagnation point was plotted for various penetrations; the rise of the free surface of the water versus penetration was determined; and the drag coefficient versus penetration was ascertained by graphic integration of the pressure-distribution curves and by acceleration measurement. The results are compared with some theoretical curves. (Author)

AD-272 593 Div. 9, 1, 3
(TISTA/WAW) OTS price $2.60

Army Chemical Research and Development Labs., Army Chemical Center, Md.
WIND-TUNNEL STUDY OF A VERTICAL-PLANE ELLIPTICAL CONE,
by Abraham Flatau and Richard H. Phelps. Nov 61, 27p. incl. illus. 3 refs. (Rept. no. CRDLR 3109; Suppl. to CRDL Special Pub. no. 1-32, AD-270 838)
Unclassified report

DESCRIPTORS: (Chemical warfare, *Gliders.) (Gliders, Wing-body configurations, *Conical bodies, Aerodynamic configurations, Aerodynamics, Model tests, Wind tunnel models, Lift, Drag, Moments, Stability.) (Chemical warfare agents, Scattering.)

The initial study of the elliptic cone configuration continued. Six-component data were obtained on both the basic body in a vertical plane and for two wing positions to determine their effect upon lateral characteristics. A limited comparison is made between these test results and the horizontal body-plane configurations from the original study. It was concluded that: (1) The vertical-plane, elliptical cone, wing-body combination has good lift-to-drag ratios but weak pitching-moment characteristics. (2) Although wing location did not affect longitudinal stability, raising the wing from the mid to the high position resulted in a greater degree of lateral instability. (3) Based on these static-stability characteristics, the vertical-plane, elliptical cone, wing-body combination does not appear to be promising as a candidate bomblet. (Author)

AD-272 615 Div. 9
(TISTA/WAW) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
TRANSONIC FLUTTER TESTS OF A HIGHLY SWEPT ARROW WING WITH AND WITHOUT SIMULATED TRAILING-EDGE-MOUNTED ENGINE MASSES,
by Gerald D. Walberg. Mar 62, 28p. incl. illus. tables, 7 refs. (NASA Technical note D-1023)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1023.

DESCRIPTORS: (*Swept-back wings, Swept wings, Engine nacelles, Aerodynamics, Transonics, *Flutter, Model tests, Wind tunnel models.) (Supersonic planes, Transport planes.)

Transonic flutter tests were made for three series of cantilevered semispan wing models which had arrow planforms and leading-edge sweep angles of 72.5 degrees. The first series were basic wing panels; the second series carried simulated engine masses and nacelles located at 34.9, 55.8, and 76.6% of the semispan; the third series carried only lightweight nacelles. The mass of each simulated engine was approximately 41% of the basic wing-panel mass. At Mach numbers below 0.975, the addition of the engine masses increased the flutter dynamic pressure of the basic wings; the nacelles do not affect the flutter boundary of the basic wings in this Mach number range. At Mach numbers above 1.05 the flutter boundary for the wings with engine masses and nacelles was higher than the boundary of the basic wings, but below the boundary for the wings with only lightweight nacelles. (Author)

AD-272 641 Div. 9
(TISTW/RD) OTS price $3.60

Army Ordnance Missile Command (Redstone Arsenal, Huntsville, Ala.)
AN APPROXIMATE STREAMTUBE METHOD TO DETERMINE THE EQUILIBRIUM FLOW FIELD ABOUT A BLUNT BODY TRAVELING AT SUPERSONIC SPEEDS.
Rept. on Detection and Discrimination,
by R. H. C. Au. Aug 61, 33p. incl. illus. table, 15 refs. (Monograph no. 10)
Unclassified report

DESCRIPTORS: (Numerical analysis for Determination of *Supersonic flow around *Blunt bodies with Supersonic flow at Chemical equilibrium.)

An approximate streamtube method is presented to determine the flow field in the frontal portion of a spherical body under the assumption that the gas is in thermodynamic equilibrium. Numerical results of this method are compared with a previously determined solution. (Author)

AD-272 772 Div. 9
(TISTP/WH) OTS price $4.60

Polytechnic Inst. of Brooklyn, N. Y.
THE VISCOSITY OF LIQUID MIXTURES.
Interim technical rept. on Experimental Techniques for Materials Research,
by Thomas O. Sedgwick and Frank C. Collins.
Dec 61, 37p. incl. tables, 23 refs.
(Contract AF 33(616)3894, Proj. 7364)
(ARL-96) Unclassified report

DESCRIPTORS: (*Viscosity, *Liquids, Fluid flow, Mixtures.) (Fluid mechanics, Solutions, Molecules, Thermodynamics.) Integral equations.

The viscosity equation of Collins and Raffel was extended to liquid mixtures and compared to the analogous expressions of Bearman and Rice and

their coworkers. Evaluation of the mixture viscosity relation has been made for regular solutions, conformal solutions and the three-liquid model of the solution state. In the last case the interactions between pairs of molecules of the two like species and those of unlike species are handled by application of the law of corresponding states applied separately to each hypothetical liquid. Comparatively simple expressions are then developed for the viscosity of the liquid mixture in terms of one or both of the pure components. The previously developed relations between the shear viscosity and the thermodynamic properties in the special case of the Lennard-Jones and Devonshire intermolecular potential were used in a similar development of the viscosity of the mixture in terms of its thermodynamic properties. (Author)

AD-272 789 Div. 9, 25
(TISTP/MFA) OTS price $3.60

Guggenheim Jet Propulsion Center, Calif. Inst. of Tech., Pasadena.
MICROWAVE PROBING OF IONIZED GAS FLOWS,
by Robert G. Jahn. Feb 62, 32p. incl. illus. 24 refs. (Technical note no. 5)
(Contract AF 49(638)758)
Unclassified report

DESCRIPTORS: (*Gas ionization and Transport properties of *Gas flow by *Microwave probes, Electron beams.) (Reliability, Tests and Measurement of Shock waves in Argon.) (Instrumentation and Experimental data.)

The measurement of free electron densities and collision frequencies in ionized gas flows by a probing transverse microwave beam is described. Interpretation of the observed reflection and transmission coefficients and their phases is developed on the basis of an idealized plane wave-plane slab model, for which typical results are displayed. Application of the device and technique to the build-up of ionization behind a strong shock in argon is outlined. Effects of various departures of the microwave radiation patterns and flow configurations from the slab assumptions are discussed and examples evaluated. (Author)

AD-272 813 Div. 9
(TISTA/LSK) OTS price $1.60

General Dynamics/Astronautics, San Diego, Calif.
ROCKET EXHAUST INTO A HYPERVELOCITY STREAM. FAR FIELD ANALYSIS,
by Hideo Yoshihara. Feb 62, 13p. illus. 4 refs.
(Rept. no. ERR-AN-128)
Unclassified report

DESCRIPTORS: (Rocket motors, *Exhaust gases, Gas flow, *Jet mixing flow, Turbulent flow, Compressible flow, Hypersonics, Wake, Transport properties, Mathematical analysis.)

Far field of a rocket jet exhausting into a surrounding medium moving at hypervelocity is analyzed using the compressible turbulent Navier-Stokes equations simplified by the boundary layer approximations. (Author)

AD-272 857 Div. 9
(TISTA/LSK) OTS price $8.10

Space Recovery Systems, Inc., El Segundo, Calif.
STUDY OF SOFT RECOVERY FROM TWO-STAGE VEHICLES,
by G. G. Schurr. Jan 62, 78p. incl. illus. tables, 14 refs.
(Contract AF 29(600)2925)
(AFOSR/DRA 62-2) Unclassified report

DESCRIPTORS: (Sounding rockets, *Space capsules, Instrumentation, Aerodynamic configurations, Re-entry vehicles, Re-entry aerodynamics, Hypersonics, Aerodynamic heating, Heat transfer, Drag, Deceleration, Parachutes, Parachute descents, *Recovery, Mathematical analysis, Feasibility studies.)

Possible recovery methods for vertically re-entering payloads released from two-stage boosters are investigated and discussed. Reentry trajectories including deceleration and heating rates were calculated for a series of reentry velocities and ballistic parameters. The influence of drag variation during reentry on peak deceleration and heating rates is investigated. A recovery method using a variable area drag brake (flexibrake), a parachute system and aerial snatch by helicopter was selected as the most suitable system for recovery of a payload released from a booster consisting of an XM-33 rocket as first stage and an ABLX 244 rocket as second stage. The flexibrake will limit the maximum deceleration to 15 G and the maximum deceleration onset rates to 300 G/sec. Attitude stabilization of the payload during the entire flight is maintained by a hydrogen peroxide attitude control system. Preliminary weights and volumes for the payload and recovery vehicle were estimated. (Author)

AD-272 890 Div. 9
(TISTP/MFA) OTS price $1.60

Grumman Aircraft Engineering Corp., Bethpage, N. Y.
THE CALCULATION OF CERTAIN CONICAL FLOWS WITHOUT AXIAL SYMMETRY (Raschet Nekotorykh Konicheskikh Techenii Bez Osevoi Simmetrii),
by P. I. Chushkin and V. V. Shchennikov, tr. by John W. Brook. Feb 62, 14p. incl. illus. 12 refs. (Trans. rept. no. TR-20 from Inzhenerno-Fizicheskii Zhurnal, Vol. 3, no. 7, July 1960)
Unclassified report

DESCRIPTORS: (Gas flow, *Supersonic flow in *Conical bodies, *Shock waves, Velocity, Mach number, Angle-of-attack indicators.) (Functions, Partial differential equations, Polynominals, Nonlinear systems.) USSR.

The problem of the calculation of certain supersonic conical gas flows without axial symmetry is examined. An approximate solution of this problem is carried out with the aid of the numerical method of integral relations. Sample calculations are given. (Author)

AD-272 900 Div. 9, 1
(TISTA/LSK) OTS price $1.50

National Aeronautics and Space Administration, Washington, D. C.
AN INVESTIGATION OF PERIODIC FORCES AND MOMENTS TRANSMITTED TO THE HUB OF FOUR LIFTING ROTOR CONFIGURATIONS,
by Milton A. Silveira. Mar 62, 59p. incl. illus. 5 refs. (Technical note D-1011)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1011.

DESCRIPTORS: (Helicopter blades, *Helicopter rotors, Wind tunnel models, Load distribution, Moments, Stresses, Vibration, Measurement, Model tests, Mathematical analysis, Harmonic analysis.)

The forces and moments transmitted to a rigidly mounted hub of dynamic models of four lifting rotor configurations were measured. Variables studied during the wind-tunnel investigation included blade pitch angle, rotor angle of attack, rotor speed, and tunnel velocities. The results of the investigation indicate that the magnitude of the periodic components of the hub thrust loading diminishes materially as the number of blades increases.

AD-272 901 Div. 9, 12
(TISTA/LSK) OTS price $1.25

National Aeronautics and Space Administration, Washington, D. C.
A STUDY OF THE AERODYNAMIC CHARACTERISTICS OF A FIXED GEOMETRY PARAGLIDER CONFIGURATION AND THREE CANOPIES WITH SIMULATED VARIABLE CANOPY INFLATION AT A MACH NUMBER OF 6.6,
by Jim A. Penland. Mar 62, 44p. incl. illus. 8 refs. (Technical note D-1022)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1022.

DESCRIPTORS: (*Gliders, Airplane models, Wind tunnel models, Aircraft canopies, Pneumatic devices, Aerodynamic configurations, Aerodynamic heating, Re-entry aerodynamics, Hypersonics, Stability, Stability (Longitudinal), Friction, Shear stresses, Lift, Drag, Aerodynamics, Model tests.) (*Re-entry vehicles, Triangular wings, Deceleration, Recovery, Landing, Airplane landing.)

Three-component force tests were made at Mach 6.6 and a Reynolds number of 0.24 times 10 to the 6th power based on the keel length of a fixed-geometry paraglider configuration consisting of a canopy having leading-edge and shroud-line diameters of 1.8% of the keel length and payload diameter of 11% of the keel length. Further force tests were made on unshrouded canopies with 3 different degrees of simulated canopy inflation. Oil-flow and temperature-sensitive-paint tests were made to study the effects of canopy geometry and shroud interference on local flow fields and aerodynamic heating. Measured force characteristics are compared with Newtonian theory.

AD-272 903 Div. 9, 30
(TISTP/MFA) OTS price $1.75

National Aeronautics and Space Administration, Washington, D.C.
INVESTIGATION OF THE PERFORMANCE OF A 78 DEGREE FLAT-PLATE HELICAL INDUCER,
by Richard F. Soltis, Douglas A. Anderson, and Donald M. Sandercock. Mar 62, 66p. incl. illus. table, 10 refs. (NASA Technical note D-1170)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1170.b

DESCRIPTORS: (*Cavitation, Reliability, Tests of *Rotor blades, *Fluid flow, Hydrodynamics, Water.) (Instrumentation, Vacuum pumps, Heat exchangers, Venturi tubes, Transducers.) (Centrifugal pumps, Vapor pressure.) Photographic analysis.

The coupling of a cavitating inducer with a pump, to realize the advantages of higher mechanical speeds, has found wide use in missile application. An effective and easily fabricated blade shape employed in the inducer has been the flat-plate helix. This report presents the measured performance of such an inducer. The rotor, 5 inches in diameter, consisted of three blades with hub-tip ratio of 0.5 and a helix angle of 78 degrees at the tip. All tests were made in water. Performance results over a range of flows are presented at both cavitating and noncavitating conditions. This includes both the over-all performance and radial distributions of flow conditions and selected blade-element performance parameters. In addition, photographs that visually describe flow conditions at various modes of operation are presented. A comparison of the measured axial velocity distributions with those computed assuming simple radial equilibrium provides a check on the validity of the radial equilibrium assumption. (Author)

AD-272 908 Div. 9
(TISTA/WAW) OTS price $9.60

Aerospace Corp., Los Angeles, Calif.
THE STATUS OF UNSTEADY AERODYNAMIC INFLUENCE COEFFICIENTS,
by William P. Rodden and James D. Revell.
22 Nov 61, 101p. incl. illus. 101 refs. (Rept. no. TDR-930(2230-09)TN-2)
(Contract AF 04(647)930)
Unclassified report

DESCRIPTORS: (*Airfoils, *Wings, *Bodies of revolution, *Fuselages, *Airplane panels, Aerodynamics, Transonics, Supersonics, Hypersonics, Downwash, Elasticity, Lift, Pressure, Gust loads, Transients, Mathematical analysis, Integral equations, Differential equations, Partial differential equations, Matrix algebra.) Viscosity, Shock waves, Vortices, Interference.

Unsteady aerodynamic influence coefficients (AICs) are defined that relate the force distribution to the downwash or deflection distribution throughout an aeroelastic system. Downwash is considered to arise from either motion or a gust, and the unsteadiness is considered oscillatory, transient, or static. Definitions are suggested for a set of oscillatory AICs for motion and for a gust, and for a set of static AICs. The use of AICs thus defined is illustrated in collocation formulations of several aeroelastic problems, and the use of the AICs in analyses by modal methods is discussed. Several possibilities for the definition of transient AICs are suggested in a preliminary review of the transient problem. The status of AICs is discussed for surfaces of various planforms by two-dimensional theories, and by three-dimensional theories, for slender bodies, and for panels, throughout the range of Mach numbers. Results are derived to illustrate the technique of AIC development.

AD-272 960 Div. 9, 27
(TISTA/LSK) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
BASE-FLOW AERODYNAMICS OF A SATURN-TYPE BOOSTER STAGE AT MACH NUMBERS 0.1 TO 2.0,
by John L. Allen. Mar 62, 31p. incl. illus. tables, 6 refs. (Technical note D-593)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-593.

DESCRIPTORS: (Liquid rocket propellants, *Booster rockets, Engine clusters, Rocket motor nozzles, *Exhaust gases, Aerodynamics, Gas flow, Pressure, Measurement.)

Results were obtained over a range of nozzle-exit to ambient pressure ratios to 4.6 using cold air in the nozzles. Tracer-gas measurements were used to determine concentration levels of jet and exhausterator gases in the base region. At high nozzle pressure ratios, base pressures in the center region were more than twice those in the outer-base region. In fact, outflow from the center region was choked for nozzle-exit to ambient static-pressure ratios greater than 1.5 based on the linear relation of centerstar and nozzle-exit pressures, and greater than 2.3 based on the less accurate constant concentration value.

AD-272 974 Div. 9
(TISTP/MFA) OTS price $4.60

Therm, Inc., Ithaca, N. Y.
LINE SOURCE DISTRIBUTIONS IN AXISYMMETRIC INCOMPRESSIBLE FLOW. II. SOLUTION OF THE INDIRECT PROBLEM,
by John P. Moran. Jan 62, 41p. incl. illus. tables, 15 refs. (Rept. no. TAR-TR 621)
(Contract Nonr-339600)
Unclassified report

DESCRIPTORS: (*Hydrodynamics, Axially symmetric flow, Fluid flow past *Bodies of revolution.) (Boundary layer, Motion, Pressure, Velocity.) (Perturbation theory, Distribution theory, Functions.)

The problem of determining the exact body shape associated with a prescribed line distribution of sources is studied. A procedure is developed which yields analytic expressions for the body shape in parametric form, in contrast with the graphical or numerical results of methods currently employed. (Author)

AD-272 996 Div. 9, 12
(TISTP/WH) OTS price $1.10

Institute of Aerophysics, U. of Toronto (Canada).
THEORETICAL INVESTIGATIONS OF THE DYNAMICS OF BODIES ENTERING THE ATMOSPHERE.
Final technical rept. for 1960-1961,
by B. Etkin. Jan 62, 5p. 6 refs. (UTIA rept. no. 80)
(Contract AF 49(638)761)
(AFOSR-2004) Unclassified report

DESCRIPTORS: (*Hypervelocity vehicles, *Aerodynamics, Stability, Lift, Drag.) (Hypervelocity vehicles, Flight paths, Atmosphere entry.) *Hypersonics.

Three theoretical investigations were completed. They dealt with (1) the longitudinal dynamics of a lifting vehicle in orbital flight; (2) perturbations, caused by pitching oscillations, to the trajectory of a lifting vehicle during reentry; (3) transition from a satellite orbit to an equilibrium glide. (Author)

10. FUELS AND COMBUSTION

AD-272 617 Div. 10
(TISTA/LSK) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
DETERMINATIONS OF LOCAL AND INSTANTANEOUS COMBUSTION CONDITIONS FROM ACOUSTIC MEASUREMENTS IN A ROCKET COMBUSTOR AND COMPARISON WITH OVER-ALL PERFORMANCE,
by Martin Hersch. Mar 62, 21p. incl. illus. tables, 6 refs. (NASA Technical note D-1192)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1192.

DESCRIPTORS: (*Combustion of Liquefied gases, Hydrogen, Oxygen, Combustion chambers, Rocket motors.) (Combustion chamber gases, Exhaust gases, *Jet acoustic oscillations, Sound, Acoustics, Velocity, Effectiveness, Measurement, Determination.)

Simultaneous local and instantaneous combustion conditions, over-all characteristic exhaust velocity efficiencies, and local chamber efficiencies were determined for a 100-lb thrust gaseous H2 combustor burning either gaseous or liquid O2 over an oxidant-fuel ratio (o/f) range of 3.2 to 10.0 at a chamber pressure of 200 lb/sq in. Combustion conditions were determined from measurements of the sound velocity at a single station in the chamber. Combustor performance varied with o/f from about 80 to 100 percent of theoretical for liquid O2 and was about 92 percent and independent of o/f for gaseous O2. The results of sound velocity measurements indicated the presence of random fluctuations of composition and temperature of the combustion gases. Losses in performance may therefore have been due to poor mixing and random burning fluctuations. (Author)

AD-272 892 Div. 10, 25
(TISTM/EJH) OTS price $1.10

Rocket Propulsion Establishment (Gt. Brit.).
DENSITY OF LIQUID OXYGEN BETWEEN 90 DEGREES AND 105 K AS A FUNCTION OF PRESSURE AND TEMPERATURE,
by B. W. A. Ricketson. Feb 62, 6p. incl. tables, 6 refs. (RPE Technical memo. no. 249)
Unclassified report

DESCRIPTORS: (*Rocket oxidizers, Liquid rocket propellants, *Liquefied gases, *Oxygen, *Density, Pressure, Temperature, Low temperature research, Theory, Mathematical analysis.) Tables, Great Britain.

These calculated values of the density of liquid oxygen for the temperature range 90 to 105 K and pressures to 200 kg/sq cm are considered more accurate than the direct measurements by E. C. Baly and F. G. Donnah (J. Chem. Soc., 81: 911, 1902.), and by E. Mathias and H. K. Onnes (Proc. Roy. Acad. Sci. Amst., 13: (939, 1911.) and calculated values of Ricketson, B.W.A. (Density of liquid oxygen between 90 and 100 K as a function of pressure and temperature. R.P.E. Tech. Memo. No.219, February 1961). It is recommended that the densities for liquid oxygen given be used until accurate measurements have been made in the temperature range under consideration. The present values are probably accurate to ± 0.1% in the temperature range 90 to 100 K. (Author)

AD-272 924 Div. 10
(TISTA/SEB) OTS price $1.10

Princeton U., N. J.
COMBUSTION PROCESSES IN LIQUID PROPELLANT ROCKET MOTORS.
Final rept. 1 Sep 55-31 Aug 60,
by Irvin Glassman. 20 Dec 61, 5p.
(Contract AF 18(600)1527)
(AFOSR-2059)
Unclassified report

DESCRIPTORS: (*Liquid rocket propellants, Fuel injection, Fuel sprays, Drops, Combustion, Chemical reactions, Reaction kinetics, Stability, High pressure research, Pressure, Tests, Theory.)

The high pressure combustion process of liquid sprays, the light scattering technique for the measurement of droplet spray characteristics, the chemical reaction rate data of fundamental reactions, and the use of gaseous propellants to determine chemical influences on combustion instability were studied. (Author)

AD-272 980 Div. 10, 25, 30
(TISTP/WH) OTS price $4.60

California U., Berkeley.
EXPERIMENTAL STUDY OF INITIAL FLAME ACCELERATION IN A SPARK IGNITED EXPLOSIVE GAS,
by A. J. Laderman, P. A. Urtiew, and A. K. Oppenheim. Feb 62, 26p. illus. 18 refs. (Technical note no. DR 11)
(Contract AF 49(638)166)
(AFOSR-2190) Unclassified report

DESCRIPTORS: (*Detonation of *Gases, Mixtures of Hydrogen and Oxygen.) (Gases, *Spark ignition, Flames, Acceleration.) Schlieren photography.

The influence of the geometry of ignition on the initial flame acceleration in spark ignited, stoichiometric hydrogen-oxygen mixtures was investigated. Observations were made using schlieren photography with simultaneous pressure measurement in the vicinity of the ignitor. Distance between the point of ignition and the closed end (backwall) of the tube was varied over the range of limiting cases where (1) the flame was in continuous contact with the backwall to where (2) the flame contacted the sidewalls of the tube before reaching the backwall. It was found that flame acceleration increased with increasing backwall distance until condition 2 was satisfied, after which further increase in backwall distance had no effect. The slower flames associated with the smaller backwall distances were attributed to heat losses to the backwall. Experimental results were interpreted by analysis in which the three dimensional flame was considered to act as an equivalent plane flame. Flame acceleration and pressure history computed in this manner for cases 1 and 2 were in fair agreement with experimental observations. The total heat loss to the backwall for case 1 was estimated to be approximately 15% of the total heat release by chemical reaction, or 0.7 cal. (Author)

11. GROUND TRANSPORTATION EQUIPMENT

No Entries

Division 12 - GUIDED MISSILES

12. GUIDED MISSILES

AD-272 559 Div. 12, 12
(TISTP/TL) OTS price $3.60

Rand Corp., Santa Monica, Calif.
A COMPUTATIONAL PROCEDURE FOR OPTIMIZING INTERPLANETARY TRAJECTORIES,
by Y. C. Ho. Feb 62, 25p. incl. illus. 12 refs.
(Research memo. no. RM-3015-PR)
(Contract AF 49(638)700)
Unclassified report

DESCRIPTORS: (*Spaceships, Thrust, *Earth to *Mars, Flight paths, Propulsion, Theory.) (*Control systems, *Non-linear differential equations, Integral equations, Matrix algebra, Vector analysis, Transformations (Mathematics), Inequalities.)

An analysis that describes a computational procedure for optimizing dynamical system trajectories by a method of successive approximations is presented. The procedure may be applied to a large class of control problems which are described by nonlinear differential equations. The performance criterion minimized by the process is the weighted sum of the squares of the terminal errors in the system state variables, subject to certain constraints on the control variables. The method is applied to the optimization of a low-thrust trajectory from earth to Mars. (Author)

AD-272 616 Div. 12, 9
(TISTA/WAW) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
MODEL INVESTIGATION OF THE LANDING CHARACTERISTICS OF A RE-ENTRY SPACECRAFT WITH A VERTICAL-CYLINDER AIR BAG FOR LOAD ALLEVIATION,
by John R. McGehee and Victor L. Vaughan, Jr.
Mar 62, 38p. incl. illus. tables, 1 ref. (NASA Technical note D-1027)
Unclassified report

Also available from NASA, Wash. 25, D. C. as NASA Technical note D-87.

DESCRIPTORS: (*Spaceships, Re-entry vehicles, Landing, Pneumatic devices, Reduction of Impact shock on Sand, Water, Concrete, Model tests, Mathematical analysis.)

Analytical and experimental investigations were made to determine the landing characteristics of a re-entry spacecraft equipped with a vertical-cylinder air bag for impact load alleviation. Assuming a rigid body and isothermal air compression and expansion, computations were made to determine accelerations for a landing on concrete from a flight-path angle of 90 degrees (vertical flight path) at a contact attitude of 0 degrees. Two models (1/6 and 1/2 scale) of the air-bag system were tested. A 1/6-scale dynamic model of a spacecraft--air-bag configuration proposed for manned re-entry was landed on concrete, on sand, and in calm water from various flight paths for a range of contact attitudes. Reasonable agreement between computed and experimental data indicates that the scaling technique developed is satisfactory for prediction of full-scale characteristics from model tests with air bags in atmospheric environment. The maximum accelerations obtained during landings on sand were about 11g along the X-axis and about 8g along the Z-axis. The maximum accelerations obtained during landings in water were about 10g along the X-axis and about 6g along the Z-axis. (Author)

AD-272 694 Div. 12, 27
(TISTA/LSK) OTS price $5.60

American Radiator and Standard Sanitary Corp., Mountain View, Calif.
DESIGN AND DEVELOPMENT OF A VAPORJET ATTITUDE-CONTROL SYSTEM FOR SPACE VEHICLES.
Final rept., Mar 60-June 61 on Microjet Control System for Orbital Vehicles,
by R. S. Miksch and K. G. Heller. Dec 61,
51p. incl. illus. tables, refs.
(Contract AF 33(616)7044, Proj. 8225)
(ASD TR 61-471) Unclassified report

DESCRIPTORS: (Spaceships, Satellite vehicles, *Satellite attitude, *Control systems by Jets, Design.) (Water, Water vapor, Propanes, Rocket fuels, Vapor pressure, Vaporization, Vapors, Jets, Ejection, Specific impulse, Thrust.)

Research and development efforts on a light-weight, long-lived, jet-thrust-reaction, attitude-control system of high reliability for space-vehicle applications are summarized. In this system, termed Vaporjet, desired characteristics are obtained through low-pressure storage of propellant in its liquid state, with conversion at saturation pressure to vapor of high specific impulse and through employment of solid-state control circuitry. Force levels of 0.1 and 0.001 lb are actuated by signals from vehicle rate and attitude sensors to eliminate rates greater than ±0.001 radian/sec and errors greater than ±0.5 degree. Water vapor having a calculated specific impulse of about 130 sec was chosen as the low-thrust fuel, using porous Teflon to effect phase separation at all gravity conditions. Saturated propyl-acetate vapor contained by a butyl diaphragm was employed to pressurize liquid water against heaters and Teflon. Propane, with a calculated specific impulse of 69 sec, was selected for high-thrust fuel because of its lower latent heat; phase separation was unsuccessful. (Author)

AD-272 767 Div. 12, 1, 28, 30
(TISTA/VGW) OTS price $3.50

North American Aviation, Inc., Downey, Calif.
INTEGRATION AND OPTIMIZATION OF SPACE VEHICLE ENVIRONMENTAL CONTROL SYSTEMS,
by S. P. Glasser and M. E. Stelzriede. Dec 61,
227p. incl. illus. tables, 96 refs. (Rept. no. SID 61-93)
(Contract AF 33(616)7635, Proj. 6146; Subcontract to North American Aviation, Inc., Los Angeles, Calif.)
(ASD TR 61-176, pt. 1) Unclassified report

DESCRIPTORS: (Satellite vehicles, Lunar probes, *Spaceships, *Space environmental conditions, Control systems for Atmosphere, *Temperature control, Theory, Design, Military requirements.) (Thermal insulation, Heat exchangers, Heat transfer, Cooling, Radiators, Refrigeration systems.) (Humidity, Pressure, Oxygen, Carbon dioxide, Nitrogen, Human engineering of Closed-cycle ecological systems, Spaceship cabins.) (Auxiliary power plants, Satellite attitude.) (Mathematical analysis, Control systems, Integration, Effectiveness, Reliability.)

The report represents the initial effort in a study of the integration and optimization of space vehicle environmental control systems. The over-all goals of this study are to develop new system concepts based on integration and to develop new methods for system optimization, con-

sidering reliability along with other system criteria. Descriptions are presented for environmental control systems and other vehicle systems, with emphasis on integration possibilities. A number of integration examples are presented. The results of a survey of potential analytical techniques applicable to system optimization are presented. Also included is a discussion of reliability analysis methods. (Author)

AD-272 830 Div. 12
(TISTB/LH) OTS price $2.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
PERTURBATIVE FORCES AFFECTING THE MOTION OF ARTIFICIAL EARTH SATELLITES.
Library reference bibliography no. 7,
by Jean E. Britton, Harrison M. Jones, and Irwin I. Shapiro. 2 Oct 61, 93p. 715 refs.
(Contract AF 19(604)7400)
Unclassified report

DESCRIPTORS: (*Satellite vehicles, Space flight, *Motion, Orbital flight paths.) (Perturbation theory, Aerodynamics, Drag, Terrestrial magnetism, Magnetic fields, Gravity, Meteorites, Hazards, Torque.) *Bibliography.

This literature on perturbative forces acting on artificial earth satellites includes theoretical calculations and the analysis of experimental and observational data. The period covered is from 1955 to June 1961. Astrodynamics is defined as those parts of celestial mechanics, aerodynamics, electromagnetic theory, exterior propulsion theory, geodesy, geophysics, astrophysics, astrometry, and observation theory that bear on the trajectories of natural and man-made satellites, planets, comets, meteorites, and other objects above the denser portions of the atmosphere. (Author)

AD-272 847 Div. 12
(TISTA/LSK) OTS price $2.60

Rand Corp., Santa Monica, Calif.
RECENT SOVIET ADVANCES IN AEROSPACE TECHNOLOGY,
by F. J. Krieger. Feb 62, 25p. incl. illus. tables, 12 refs. (Research memo. no. RM-3053-PR)
(Contract AF 49(638)700, Proj. Rand)
Unclassified report

Presented as part of the National Tracking and Command of Aerospace Vehicles Symposium held by the Institute of the Aerospace Sciences in San Francisco at the Jack Tar Hotel, February 19-21, 1962.

DESCRIPTORS: (*Space flight, Space probes, Lunar probes, Satellite vehicles, Spaceships, Manned, USSR.) (*Rocket motors, Staging, Rocket propulsion, Thrust, Launching, Stabilization.) (Guided missile research, *Research program administration.)

The Soviet aerospace program has been developing in three well-defined, although interrelated, phases--the earth-orbital, the lunar, and the interplanetary--with corresponding increase in technological complexity. All phases are aimed at eventual manned interplanetary travel. The current earth-orbital, or man-in-space, program, having received the greatest emphasis, has perforce been the most successful. In the interest of economy and expediency, there is a trend in the Soviet Union toward the development of more powerful propulsion systems for launching space vehicles than heretofore used by combining rocket motors with special purpose turbojet and ramjet engines. (Author)

AD-272 869 Div. 12, 2
(TISTP/MFA) OTS price $2.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
THE LOCAL BEHAVIOR OF CIRCULAR ORBITS,
by Fred C. Schweppe. 23 Feb 62, 20p. incl. illus. tables, 2 refs. (Rept. no. 22G-6)
(Contract AF 19(604)7400)
(AFESD TDR 62-56) Unclassified report

DESCRIPTORS: (*Satellites and *Satellite vehicles in *Orbital flight paths around the Celestial mechanics, Earth.) (Transformations (Mathematics), Taylor's series, Matrix algebra, Partial differential equations.)

The local behavior of a satellite in a circular orbit is presented for four different coordinate systems. The simplicity of the expressions makes them valuable for reference in general investigations of circular and near-circular orbits. (Author)

AD-272 876 Div. 12, 2
(TISTP/MFA) OTS price $2.00

National Aeronautics and Space Administration, Washington, D. C.
ANALYSIS OF SOLAR-RADIATION SHIELDS FOR TEMPERATURE CONTROL OF SPACE VEHICLES SUBJECTED TO LARGE CHANGES IN SOLAR ENERGY,
by George J. Nothwang, John C. Arvesen, and Frank M. Hamaker. Mar 62, 76p. incl. illus. tables, 9 refs. (NASA Technical note D-1209)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1209.

DESCRIPTORS: (*Shielding of Conical bodies, *Spaceships from Thermal radiation, *Solar energy.) (Temperature and Heat transfer, Control systems, Thermal conductivity of Materials.) (Functions, Integral equations.)

An analysis was made of a passive temperature control system for a space vehicle subjected to variable solar energy. This system effectively isolates the capsule from the incident solar energy by the use of solar-radiation shields. The desired temperature level of the capsule could then be maintained by a constant internal heat load. The analysis was developed on the basis of diffusely reflecting isothermal surfaces and permits evaluation of the temperatures of various shield-capsule configurations. Several shield-capsule configurations were studied and parameters were established which indicate the important criteria for achieving the desired temperature control. The effects of specularly reflecting (instead of diffusely reflecting) surfaces and the effects of shield thermal conductivity on capsule temperature were also studied. Results from these studies were applied to the single-shield, conical-capsule configuration and it was found that these effects did not significantly alter the magnitude of temperature control achieved. (Author)

AD-272 877 Div. 12, 27
(TISTA/LSK) OTS price $1.50

National Aeronautics and Space Administration, Washington, D. C.
ANALYSIS OF TWO THRUSTING TECHNIQUES FOR SOFT LUNAR LANDINGS STARTING FROM A 50-MILE ALTITUDE CIRCULAR ORBIT,
by M. J. Queijo and G. Kimball Miller, Jr. Mar 62, 51p. incl. illus. table, 1 ref. (NASA Technical note D-1230)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1230.

DESCRIPTORS: (*Lunar probes, Orbital flight paths, Deceleration, Landing on Moon by Retro rockets, Thrust, Fuel consumption, Mathematical analysis, Feasibility studies.)

An analytical study was made of 2 modes of thrusting to perform soft lunar landings starting from a circular orbit around the moon. One method made use of constant-thrust, restartable engines. In this landing mode a short thrust period is used to initiate the landing maneuver. This is followed by a coasting period, after which thrust is applied to perform the landing. The second landing mode presupposes the use of engines having 2 levels of thrust. The low thrust level is used to initiate the landing maneuver and is applied until conditions are attained which permit use of the higher thrust level for landing the vehicle. In all instances the thrust vector is directed against the velocity vector. The study showed that either landing mode could be made quite economical by proper choice of maximum thrust available and the range covered in the landing maneuver. Use of a maximum ratio of thrust to initial earth weight of 0.45 combined with a surface travel of about 30 degrees requires a characteristic velocity of about 6,000 fps, which is about 6.5% greater than the value of 5,630 fps required for a 2-impulse Hohmann transfer. (Author)

AD-272 879 Div. 12, 30
(TISTW/EET) OTS price $1.60

Operations Analysis Group, Office of Naval Operations, Washington, D. C.
USAGE MANUAL FOR MOD I SAM ANTI-AIR SIMULATION PROGRAM FOR IBM 7090,
by Kenneth E. Willis. 8 Dec 61, 14p. incl. illus. tables (Interim research memo. no. 4)
Unclassified report

DESCRIPTORS: (*Fire control computers, *Computers, Simulation, Interception probabilities, Surface to air, *Guided missiles, Aircraft.) (*Antiaircraft defense systems, Computers, Programming.) (Aerial targets, Interception.) Games theory.

Research concerns a program which computes the maximum possible number of intercepts that a particular surface-to-air missile system can achieve against a particular point or stream air raid when the points of initial radar acquisition, the last allowable intercept, and the parameters to describe the systems are given. Instructions are given for using the program, and a brief explanation of the mechanics of the simulation is presented. (Author)

AD-272 902 Div. 12
(TISTA/LSK) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
CHARACTERISTICS OF THREE PRECISION CIRCUMLUNAR TRAJECTORIES FOR THE YEAR 1968,
by John P. Gapcynski and Donald S. Woolston. Mar 62, 16p. incl. illus. tables, 4 refs. (NASA Technical note D-1028)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1028.

DESCRIPTORS: (*Lunar probes, *Spaceships, Manned, Launching, Space flight, Orbital flight paths, Guided missile trajectories, Exterior ballistics, Terminal ballistics, Atmosphere entry, Landing, Mathematical analysis, Mathematical prediction.)

The characteristics of 3 precision circumlunar trajectories are presented for use in the study of a manned mission in the year 1968. These trajectories were obtained with the use of a restricted 4-body, 3-dimensional trajectory program utilizing actual calendar dates and body positions as obtained from U.S. Naval Observatory data. The constraints associated with each of these trajectories are launch from Cape Canaveral, Florida, touchdown in the continental United States, and injection conditions compatible with the capabilities of a booster such as the Saturn vehicle. The injection dates were selected to obtain the trajectory characteristics associated with each of the lunar motions which may be encountered, with a direct launch from Cape Canaveral, that is whether the moon is descending, ascending, or at maximum negative declination at the time of periselenian passage. (Author)

AD-272 904 Div. 12, 15
(TISTP/MFA) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
COMPUTATIONAL PROCEDURE FOR VINTI'S THEORY OF AN ACCURATE INTERMEDIARY ORBIT,
by N. L. Bonavito. Mar 62, 24p. 4 refs. (NASA Technical note D-1177)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1177.

DESCRIPTORS: (*Satellite vehicle research, Motion and *Orbital flight paths of Satellite vehicles.) (*Celestial mechanics, Harmonic analysis, Transformations (Mathematics), Polynomials, Partial differential equations.)

By introducing the oblate spheroidal system of generalized coordinates into the solution of Laplace's equation, three adjustable constants are provided by which this solution can be made to agree largely with the earth's potential expressed by means of a general expansion in spherical harmonics. This agreement is exact for the zeroth, first, and second zonal harmonics, and as a consequence of this system, through more than half of the latest accepted value of the earth's fourth harmonic. Based on this theory of Vinti's solution by separable Hamiltonian, a computing procedure is described for obtaining the coordinates and velocity of an unretarded satellite from a knowledge of its initial conditions. (Author)

AD-272 922 Div. 12, 1, 28, 30
(TISTA/VGW) OTS price $5.00

North American Aviation, Inc., Los Angeles, Calif.
ENVIRONMENTAL CONTROL SYSTEMS SELECTION FOR MANNED SPACE VEHICLES.
Dec 61, 299p. incl. illus. tables, 81 refs.
(Rept. no. NA 61-488)
(Contract AF 33(616)7635)
(ASD TR 61-240, pt. 1, Vol. 1)
Unclassified report

DESCRIPTORS: (*Space environmental conditions, Control systems for Manned, Spaceships, Satellite vehicles, Space flight.) (Design, *Temperature control, Atmosphere, Heat transfer, Heat exchangers, Radiators, Water, Humidity, Oxygen, Nitrogen, Carbon dioxide, Contamination, Food, Storage, Closed cycle ecological systems, Human engineering.) (Effectiveness, Reliability, Mathematical analysis, Feasibility studies.) (Hydrogen, Liquid rocket propellants, Coolants, Cooling, Refrigeration systems.)

Realistic requirements for thermal and atmospheric control systems are developed based upon actual preliminary designs of a series of manned orbital space vehicles having mission durations from 36 hours to 6 weeks. The vehicles also cover a range of crew size, equipment heat load, reentry weight, and reentry wing loading. The report is divided into two volumes, with Volume II (Secret) containing detailed missions and roles data for the vehicles. Based upon these vehicles, a series of active and semipassive thermal and atmospheric control systems are developed and analyzed. Integration of these systems with associated systems such as life support and secondary power is discussed. A system using hydrogen fuel as a heat sink was analyzed in detail, and results are presented. Methods of systems analysis received considerable attention, and a preliminary version of a long-range procedure for system performance analysis and optimization is presented. (Author)

AD-272 950 Div. 12
(TISTA/VGW) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
A CLASS OF MINIMUM ALTITUDE VARIATION ORBITS ABOUT AN OBLATE EARTH,
by L. Rider. 23 Mar 61, 11p. incl. illus. 2 refs. (Rept. no. TDR-594(1560-01)TN-2)
(Contract AF 04(647)594)
Unclassified report

DESCRIPTORS: (Mathematical analysis of *Satellite vehicles, Injection into *Orbital flight paths about Earth at High altitude.) (Exterior ballistics, Celestial mechanics.)

The results of Anthony and Fosdick (Preprint 1231-60 ARS Semi-Annual Meeting, May 1960; and IAS National Summer Meeting, June 1960) concerning near-circular orbits in an oblate potential field are used to determine the characteristics of orbits with the property that the maximum altitude variation over an oblate earth during a complete revolution is minimized. The analysis considers all near circular orbits with arbitrary inclination and apse location. The solution orbits are found to have apses over the equator and at extreme latitude. Polar orbits experience the greatest altitude variation. Equatorial orbits can be constructed which show no altitude variation and hence are truly circular. In general, the altitude variation depends upon average altitude and orbital inclination. (Author)

AD-272 955 Div. 12, 25
(TISTW/DLW) OTS price $4.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
THE STUDY OF ELECTROMAGNETIC TECHNIQUES FOR SPACE NAVIGATION.
Quarterly progress rept. no. 8, 16 Nov 61-15 Feb 62,
by R. G. Franklin, J. A. Palladino, and D. L. Birx. 15 Feb 62, 40p. incl. illus. tables, 2 refs. (Rept. no. Q-A2415-8)
(Contract AF 33(616)7244, Proj. 0(610)4427)
Unclassified report

DESCRIPTORS: (*Space navigation, *Celestial navigation, Electromagnetic waves, Optical systems, Doppler systems, Stars, Light transmission, Spectrographic analysis.) (*Interferometers, Templates, Light, Sources, Intensity, Sensitivity, Tests, Signal-to-noise ratio.)

A series of experiments to determine the relative importance of template parameters in influencing instrument sensitivity was made. To a large extent, variations in template line width can be accommodated with adjustments of the spectrograph slit. Contrast is important and must be as large as possible for best sensitivity. A reduction in dispersion results in reduced sensitivity, but line widths of the templates used were not comparable on an Angstrom basis so that further tests are needed. A new vibrating mirror arrangement permitted operation at 500 cps with a reduced noise level. Results of interferometer measurements are included with complete operating instructions. (Author)

AD-272 971 Div. 12, 6
(TISTW/RD) OTS price $5.60

Air Force Cambridge Research Labs., Bedford, Mass.
SATELLITE-TRACKING,
by O. E. Kerr, W. J. Kearns and others.
Dec 61, 47p. incl. illus. 11 refs. (Rept. no. AFCRL-1102)
(Proj. 4600)
Unclassified report

DESCRIPTORS: (Interferometers, Direction finding, Antennas, Doppler systems for *Tracking, *Satellite vehicles.) (Radio-frequency filters for *Doppler tracking of Satellite vehicles.) Satellite vehicle trajectories, Orbital flight paths.

The relative merit of the instrumentation developed to obtain doppler, directional, and interferometer data is discussed and evaluated in terms of the use of the data. The three simplified methods presented use data obtained from a small network of ground stations to approximate the position, elevation, velocity, and direction of a transmitting satellite. The necessary assumptions (stationary system on a planar earth and horizontal flight at constant velocity) prohibit determination of the complete orbit. The information obtained does narrow the field of search for instruments of greater precision. (Author)

Division 13 - INSTALLATIONS AND CONSTRUCTION
Division 14 - MATERIALS (NON-METALLIC)

13. INSTALLATIONS AND CONSTRUCTION

No Entries

14. MATERIALS (NON-METALLIC)

AD-272 592 Div. 14, 17
(TISTM/EJH) OTS price $8.60

Army Chemical Research and Development Labs., Army Chemical Center, Md.
TENTH MATERIALS REVIEW,
by Arthur Lyem. Nov 61, 97p. refs. (CRDL Special pub. no. 4-32)
(Proj. 4C93-30-001)
Unclassified report

DESCRIPTORS: (*Materials, *Organic materials, *Ceramic materials, Inorganic substances, *Fibers, Production, Synthesis, Manufacturing methods.) (Metalorganic compounds, *Polymers, *Plastics, Heat resistant polymers, Resins, Laminates, Coatings, Adhesives.) (*Synthetic fibers, Textiles.) (Metals, Alloys.) (Toxicity, Hazards.) (Radiation effects, Space environmental conditions, Guided missiles.) Solid rocket propellants, *Bibliography.

The purpose of this periodic review is to present important technical and scientific highlights regarding materials research here and abroad, principally in the polymer and plastics fields. The information is intended to serve as a timely and convenient reference for Chemical Corps Laboratories and agencies. (Author)

AD-272 608 Div. 14, 8
(TISTM/GEC) OTS price $18.00

Litton Industries, Van Nuys, Calif.
STUDIES AND SURVEYS IN THE FIELD OF PRINTED CIRCUIT BOARDS AND FOIL CLAD LAMINATES.
Final rept., 1 July 60-30 June 61,
by John Jackman. 30 June 61, 270p. incl. illus. tables.
(Contract DA 36-039-sc-85383)
Unclassified report

DESCRIPTORS: (*Printed circuits, Materials, Surface properties, Electrical properties, Mechanical properties.) (Tests, Electric insulation, Resistance, Temperature, Adhesion, Deterioration, Dielectric properties, Water, Absorption.) (*Laminates, Paper and Phenolic resins or Epoxy resins, Silicone resins or Ethylenes and Fluorides and Polymers, Resins and Glass textiles.) (*Foils, Copper.) Conductors, Test methods, Test equipment, Design.

Results of a study covering 5 areas of interest in the evaluation of foil clad laminates used for the manufacture of printed wiring boards are reported. This study covers the design and construction of necessary testing equipment, the establishment of testing procedures, and the gathering of experimental data to provide more complete information for specification requirements for these materials. This report is divided into 5 areas of discussion as follows: Allowable limits per square for nicks, pin holes and scratches on printed wiring boards; Study of insulation resistance on foil clad laminates; Peel strength after dip solder; Peel strength at elevated temperatures; and a complete evaluation of copper clad paper base epoxy laminates. Specimen preparation, testing methods, an analysis of experimental data, and where appropriate, recommended specification provisions are presented under each task. (Author)

AD-272 630 Div. 14, 27, 26
(TISTM/GEC) OTS price $1.60

Rocketdyne, Canoga Park, Calif.
PREIMPREGNATED ROVING STUDY.
Monthly progress rept. no. 10, 1-31 Jan 62,
by M. A. Leeds. 23 Feb 62, 13p. incl. illus. tables (Rept. no. 62RC2390)
(Contract NOw 61-0498-c)
Unclassified report

DESCRIPTORS: (*Rocket cases, Propellant tanks, Cylindrical bodies, *Filament wound construction, Manufacturing methods, Processing.) (Fibers, *Synthetic fibers, *Glass textiles, Impregnation, Resins, Epoxy resins, Laminates.) (Tests, Pressure, Tensile properties.) Wire winding machines.

Thick-walled 3-in.-diam cylinders were fabricated and tested as part of the resin migration study. Resin contents were measured and resin migration was calculated by two different equations. Analysis was made and results were compared to similar results on thin-walled cylinders. Preliminary data obtained on the packaging study are given. Discussion is presented on parallel-wound and way-wind packages, and comparisons are made on applying winding tension at the package vs on the strand only. A discussion of preparations taken for the winding of ABL-size cases on the numerically controlled winding machine is presented. (Author)

AD-272 636 Div. 14, 3
(TISTM/GEC) OTS price $1.60

Institute of Paper Chemistry, Appleton, Wis.
DEVELOPMENT OF AN IMPROVED DIFFUSION BOARD MATERIAL.
Interim rept. no. 14, 29 Oct 61-5 Feb 62,
by L. E. Leporte and T. A. Howells. 19 Feb 62, 7p. incl. tables.
(Contracts DA 18-108-405-cml-941 and DA 18-108-cml-6561, Proj. 2256)
Unclassified report

DESCRIPTORS: (*Fiberboard, *Woodpulp fibers, Woodpulp, Stability, Chemical warfare agents, Poisonous gases.) (Additives to Cyanogen chlorides, Ethanols, Amines, Calcium compounds, Carbonates, Zinc compounds, Copper compounds, Oxides.) (Aging, Temperature, Storage, Water, Absorption.)

The results of tests of CK life and tropical aging carried out on a series of boards are reported. Aquapel 360 (at 0.5%) and Kymene 557 (0.2%), individually and together, had detrimental effects on CK life and the tropical stability of CK life; plain board showed marked loss of CK life on aging. Addition of a few per cent ZnO or CuO decreased the loss of CK on aging; removal of hot water solubles and resins from pulps decreased somewhat the loss of CK life on tropical aging. Modified Cobb tests carried out on board samples containing Aquapel 360 and Kymene 557 after aging for periods of 1 to 4 wk in tropical conditions showed a decrease in moisture pickup in comparison to samples not aged in tropical conditions. (Author)

AD-272 669 Div. 14, 17, 22, 30
(TISTM/EJH) OTS price $1.60

Technical Operations, Inc., Burlington, Mass.
HYPERVELOCITY PARTICLE EFFECTS ON MATERIAL.
Quarterly progress rept. no. 2,
by Victor E. Scherrer and Robert R. McMath.
31 Dec 61, 16p. incl. illus. (Rept. no.
TO-B 62-3)
(Contract AF 33(616)8423)
Unclassified report

DESCRIPTORS: (*Plastics, Polymers, Esters, Ethylenes, Fluorides, *Particles, Hypervelocity projectiles, Velocity, Terminal ballistics, Penetration, Materials, Lead, Waxes, Acrylic resins.) (Laboratory equipment, High speed cameras, Hypervelocity guns.)

The range of projectile densities was extended from 0.9 to 2.2 with the successful acceleration of polyethylene, Mylar and Teflon particles. Velocities in excess of 32,000 ft/sec were achieved with Mylar particles 10 mils thick, 0.375 and 0.5 in. diam., and weighing 24.7 and 44 mg. respectively. A single particle impact was achieved with the smaller particle. Successful projection of 11-mg Mylar particles to velocities of 20,000 to 62,800 ft/sec was achieved. Target materials included lead, lucite, and wax. Laboratory equipment includes an energy-storage system consisting of a parallel connection of eight 1-microfarad capacitors discharged by a hypervelocity gun, a streak camera, a high-intensity pulsed backlighting source, photomultiplier tubes, and crater profile tracing equipment.

AD-272 671 Div. 14, 4
(TISTM/GEC) OTS price $1.60

Naugatuck Chemical Div., United States Rubber Co., Conn.
SYNTHESIS OF REGULATED STRUCTURE POLYPHENYLETHER-SILOXANE ELASTOMERS.
Quarterly progress rept. no. 2, 1 Oct-30 Dec 61,
by P. L. Merz. 30 Dec 61, 13p. incl. illus.
(Contract DA 19-020-ORD-5507)
Unclassified report

DESCRIPTORS: (*Elastomers, *Heat resistant polymers, *Vulcanizates, Synthesis, Polymers, Hydroxides, Phenyl radicals, Ethers, Silanes, Silicones.) (Quinones, Bromides, Phenols.) (Chemical reactions, Condensation reactions, Hydrolysis, Copolymerization, Fractionation.) Chromatographic analysis.

The compounds 4,4'-dihydroxydiphenylether was prepared by the alkaline hydrolysis of 4,4'-dibromodiphenylether in a stirred, 1 l. autoclave. Reaction conditions employed were substantially those described in the German Rittler Patent (Ger. 609,080, Jan. 17, 1935). It was believed that the lower yields (21-1/2% vs. 60% claimed by Rittler) as well as the negative results were due to the extreme sensitivity of this hydrolysis to catalysis. Two attempts to prepare 4,4'-dihydroxydiphenylether via the Williamson Synthesis resulted instead in the formation of 4 stable liquid by-products together with an unknown pyrophoric material. An attempt was made to prepare p,p'-dihydroxytetraphenylether by condensing the mono-sodium salt of hydroquinone with 4,4'-dibromodiphenylether. (Author)

AD-272 761 Div. 14, 4, 17
(TISTM/EJH) OTS price $5.60

New York U. Coll. of Engineering, N. Y.
RESINS BASED ON COMPLEX FORMATIONS WITH ORGANO-TITANATES.
Technical rept. no. 4, 1 Nov 61-15 Jan 62.
31 Jan 62, 49p. incl. illus. tables.
(Contract NOw 61-0433-d)
Unclassified report

DESCRIPTORS: (*Heat resistant polymers, Polymers, *Metalorganic compounds, Resins, *Epoxy resins, *Coatings, Pigments, Additives, Synthesis, High temperature research, Stability, Pyrolysis, Deterioration.) (Complex compounds, Propyl radicals, *Titanates, Vinyl radicals, Cyclohexenes, Dioxides, Titanium compounds, Zinc compounds, Aluminum compounds, Silicones.) (Steel, Plastic coatings.)

The development and evaluation of titanate resins which have shown resistance to exposure to temperatures around 600, 800, and up to 1000 F for considerable lengths of time continued. Weight loss of resinous coatings on steel during such exposure and the reason for these weight losses were investigated. The losses which did occur were mostly limited to the escape of high boiling solvents which were retained during the initial curing of the films at 200 F. Where the losses were greater than such solvent residues, they were mostly limited to the weight of organic additives used in the coatings as plasticizers and modifying agents of the titanate resins. In one study the Al pigmented titanate resin coating contained 60% resin and 40% Al pigment after being heated for a total of 50 hr up to a temperature of 600 F. and for an additional 5 hr at 1000 F. (Author)

AD-272 780 Div. 14, 17
(TISTM/GEC) OTS price $3.60

Southern Research Inst., Birmingham, Ala.
THE DEVELOPMENT OF HEAT-RESISTANT PAINTS FOR METALS.
Bimonthly progress rept. no. 5, 1 Oct-30 Nov 61,
by A. E. Raeuber. 18 Dec 61, 28p. incl. tables.
(Rept. no. 6259-1264-5)
(Contract NOw 61-0546-d)
Unclassified report

DESCRIPTORS: (*Heat resistant paints, Preparation from Metallic compounds, Metalorganic compounds, Zinc compounds, Oxides, Methyl radicals, Hydrogen compounds, Phosphites, Ethyl radicals, Phosphates.) (*Metal coatings for *Metals, Manufacturing methods, Processing, Phosphate coatings, Ceramic coatings, Silicon compounds, Dioxides, Temperature, Resistance, Weatherproofing, Hardness, Aging.)

The ZnO-dimethyl hydrogen phosphite (DMHP)-ethyl acid phosphate (EAP) coating systems were studied. ZnO made by the French process, which has modular-shaped particles, produced smoother ZnO-DMHP-EAP coatings than ZnO made by the American process, which has acicular-shaped particles. It was found that addition of water to coating mixtures of this type accelerated reaction and resulted in harder, better-bonded coatings. Application of several thin coats of ZnO-DMHP-EAP compositions produced coatings with better properties than application of a single thick coat. Overcoating ZnO-DMHP-EAP coatings with colloidal silica increased the hardness, glossiness, and heat-resistance of the coatings. The use of silicates in the reaction mixtures was not promising. Other metal oxides showed no advantage over ZnO in a re-evaluation of coatings prepared with the organophosphorus compounds. Frit 1 also remains the best frit yet produced for preparing heat-resistant coatings from frits and organophosphorus compounds. The effective potlife of the ZnO-DMHP-EAP reaction mixture was about 15 min. Most of the curing of the coating apparently takes place during the first 90 min after application. (Author)

AD-272 788 Div. 14, 12
(TISTM/GEC) OTS price $7.60

Bjorksten Research Labs., Inc., Madison, Wis.
HIGH VISCOSITY REFRACTORY FIBERS.
Final summary technical rept., 20 Oct 59-30 Sep 61,
by Stanley A. Dunn and William P. Roth. Feb 62, 72p. incl. illus. tables, 5 refs.
(Contract NOrd-19100)
Unclassified report

DESCRIPTORS: (*Refractory materials, *Ceramic fibers, Thermal insulation, Fibers.) (*Silicon compounds, *Dioxides, Additives, Chromium compounds, Oxides, Molybdenum compounds, Silicides, Copper.) (Tests, Viscosity, Determination by Deformation, Rods, Fibers, Ablation, Resistancce, Blackbody radiation.) Guided missile noses, Rocket motor nozzles, Plastics, Reinforcing materials.

It was demonstrated in C glass, E glass, and silica that the viscosity of vitreous materials was increased by admixture of fine dispersions of insoluble, nonreactive, refractory materials. The effect was too large to be accounted for by volume immobilization and appeared to be due mainly to frictional forces between additive particles. Evidence was obtained that insoluble nonreactive additives, which were molten instead of solid, would also increase viscosity, provided the particle size was sufficiently fine. With vitreous reinforcing fibers aligned with the flow of heat, color in the fibers was shown to improve the thermal shielding afforded by the composite layer. Marked increases in the ablation resistance if silica through the additions of various additives appeared to be the result of cooling effects associated with the generally increased emissivities of the silica-additive mixtures. (Author)

AD-272 961 Div. 14, 4
(TISTM/GEC) OTS price $1.75

Narmco Industries Inc., San Diego, Calif.
RESEARCH AND DEVELOPMENT OF HIGH TEMPERATURE STRUCTURAL ADHESIVES.
Quarterly progress rept. no. 5, 1 Sep 61-31 Jan 62,
by Sven H. Ruetman and Harold H. Levine. Feb 62, 58p. incl. illus. tables.
(Contract NOw 61-0254-c)
Unclassified report

DESCRIPTORS: (High temperature research, *Adhesives, *Resin adhesives, *Heat resistant polymers, Resins, Phenolic resins, Silicone resins, Epoxy resins, *Laminates, Binders, Synthesis, Pyrolysis, Chemical reactions.) (Tests, Oxidation, Resistance, Tensile properties, Temperature, Stability, Bonding, Mechanical properties.) Rocket motor nozzles.

Constructive pyrolysis of silicone-phenolic laminates at elevated temperatures in Ar indicated a major structural change in the resin at 1250 F. A very large decrease in volume resistivity occurred. Approximately the same outstanding oxidation resistance and good retention of high temperature tensile shear strength were obtained at 1500 and 1800 F. When exposed to air for 30 hr at 650 F a refrasil laminate, made with zirconium phenoxy-aldehyde resin, underwent complete oxidative destruction, despite the previous constructive pyrolysis in Ar at 1800 F. A laminate made with phosphonitrilic chloride-hydroquinone condensation products delaminated at 500 F in Ar. The 1800 F pyrolyzed specimens had good oxidation resistance at 650 F, in air. An epoxy-novolac adhesive cured with As_2S_3 + As_2O_5 had a tensile shear strength of 940 psi after 10 min at 1000 F. Another formulation containing As_2O_3 in place of As_2O_5 gave 975 psi after 1000 hr at 500 F and 855 psi after 10 minutes at 1000 F. 1,4-Butanediphosphonic acid, arsenic thioarsenate, bis-(-2-hydroxyphenyl)methane, 1,2-propylene sulfide, 1-chloro-2,3-propylene sulfide, beta-hydroxythiouronium were synthesized. (Author)

15. MATHEMATICS

AD-272 610 Div. 15
(TISTP/MFA) OTS price $1.10

Institute for Fluid Dynamics and Applied Mathematics, U. of Maryland, College Park.
ON ALMOST PERIODIC SOLUTIONS OF A CLASS OF ELLIPTIC EQUATIONS,
by Alexander Weinstein. Feb 62, 7p. 7 refs.
(Technical note no. BN-279)
(Contract AF 49(638)228)
(AFOSR-2138) Unclassified report

DESCRIPTORS: (*Partial differential equations, *Functional analysis, Integral equations, Series, Functions.)

It is proved that all solutions of a class of elliptic equations which are bounded in a strip and satisfy homogeneous boundary conditions are almost periodic. (Author)

AD-272 698 Div. 15
(TISTP/MFA) OTS price $7.60

California U., Berkeley.
REFLECTION OF BIHARMONIC FUNCTIONS ACROSS ANALYTIC BOUNDARY CONDITIONS,
by James M. Sloss. Dec 61, 69p. 2 refs. (Technical rept. no. 17)
(Contract Nonr-22262, Proj. NR 041-214)
Unclassified report

DESCRIPTORS: (*Functions and *Potential theory of *Elasticity and Stresses.) (*Harmonic analysis, Conformal mapping, Partial differential equations, Taylor's series, Polynomials, Transformations (Mathematics).)

The reflection of solutions of a biharmonic equation across an analytic arc satisfies two analytic boundary conditions. More specifically but without stating all hypotheses, if a biharmonic function is given on a simply connected open set, partially bounded by an analytic arc (without end points), and satisfies two analytic boundary conditions, then there exists a simply connected region containing the analytic arc in its interior, and a unique function biharmonic on this region, which agrees with the biharmonic function. There are two cases treated. In the first case, linear boundary conditions with analytic coefficients are given and a condition on the coefficients is stated. In the second case, nonlinear boundary conditions are given, and a condition is stated, which when satisfied, permits reflection locally. The conditions in the linear case will cover, among other things, the boundary conditions of the first and second fundamental boundary value problems of elasticity as well as the fundamental mixed boundary value problems in elasticity. (Author)

16. MEDICAL SCIENCES

AD-272 529 Div. 16
(TISTB/LH) OTS price $1.10

Birmingham U. (Gt. Brit.).
PROTEIN ABSORPTION IN SPRUE.
Final annual technical status rept., 15 Nov 60-30 Nov 61,
by J. M. French. 30 Nov 61, 5p.
(Contract DA 91-591-EUC-1640)
Unclassified report

DESCRIPTORS: (*Proteins, *Labeled substances, Diet, Metabolism.) (*Sprue, Biochemistry, Absorption, Metabolic products, Deficiency diseases.)

Studies were conducted on the feeding of vegetable (yeast) protein labelled with the stable isotope of nitrogen 15N to normal individuals and to patients with sprue to determine if there is a difference (1) in the rate of absorption (2) in faecal and urinary excretion, quantitatively and qualitatively. (Author)

AD-272 581 Div. 16, 1, 12
(TISTB/AW) OTS price $2.50

Naval School of Aviation Medicine, Pensacola, Fla.
ANIMALS AND MAN IN SPACE. A CHRONOLOGY AND ANNOTATED BIBLIOGRAPHY THROUGH THE YEAR 1960,
by Dietrich E. Beischer and Alfred R. Fregly. 1962, 97p. incl. tables, 5 refs. (Monograph no. 5; ONR rept. no. ACR-64)
Unclassified report

DESCRIPTORS: (*Bibliography, *Astronautics, *Space medicine, *Space flight, Space capsules, Weightlessness, Balloons, Manned, Cosmic rays, Man, Laboratory animals.) Scientific research.

This work brings together for the first time a listing of all available reports relating to biological experiments conducted during balloon and rocket flights, with plants, animals, and humans as subjects. This compilation includes a listing of pertinent bibliographies, monographs, technical publications, and periodical articles. Detailed tabulations are given of all known balloon and rocket flights, including such information as flight designation, location, type of experiment, experimental subjects, height, duration, success or failure, investigators, and cross-references to literature. A selective subject index is included, listing experimental material and giving cross-references to literature. Most of the citations are annotated. (Author)

AD-272 661 Div. 16
(TISTB/AW) OTS price $1.10

North Texas State U., Denton.
SUBSTITUTED AMINOTHIOLS AS POTENTIAL ANTIRADIATION DRUGS.
Final technical rept., 1 June 60-31 Jan 62,
by C. W. Schimelpfenig. 27 Feb 62, 3p.
(Grant DA-MEDDH-60-7)
Unclassified report

DESCRIPTORS: (*Radioprotective drugs, *Amines, Ethyl radicals, Anilines.) Synthesis.

The desired compounds, 3-alpha-(2 mercaptoethylamino)cholestane and 3-beta-(2-mercaptoethylamino)cholestane were never prepared because the proper conditions were not found for mercaptoethylation of the amines. Two methods of mercaptoethylation were found which were successful for aniline but were unsuccessful for the aminocholestanes. Cursory investigations were made of a number of reaction sequences expected to lead to N,N-disubstituted-mercaptoethylamines. (Author)

AD-272 684 Div. 16, 14
(TISTM/GEC) OTS price $1.60

Dental Research Facility, Naval Training Center, Great Lakes, Ill.
CLINICAL EVALUATION OF TEMPORARY RESTORATIVE MATERIALS,
by Robert B. Wolcott, William R. Shiller, and Leonard M. Kraske. Dec 61, 9p. illus. tables, 16 refs.
(Proj. MR005.12-5004.11)
Unclassified report

DESCRIPTORS: (Dental research, *Dental materials, *Zinc compounds, *Oxides, *Phosphates, *Silver alloys, *Silicates.)

Temporary restorative materials were used to restore teeth as a preventive dentistry measure. Certain materials were capable of effectively restoring teeth for a period of at least 6 mo. Of the materials tested the Zn silicate cement and the combination Zn phosphate-alloy cement revealed the least clinical changes during a 6 mo. period. The Zn-silicate cement has the

advantage of color harmony, of possessing a small amount of fluoride, and having good physical qualities. The combination zinc phosphate-alloy cement has good physical qualities and was comparable to Zn silicate cement. This material could be prepared from supplies available from the Federal Supply Catalog. Its principal disadvantage was its appearance. A copal liner beneath cement restorations affords good protection to the pulp. (Author)

AD-272 758 Div. 16
(TISTB/AW) OTS price $7.60

Lever Bros., Co., Edgewater, N. J.
BASIC STUDIES IN PERCUTANEOUS ABSORPTION.
Semi-annual rept., July-Dec 61,
by Leonard J. Vinson, Bohdan R. Choman and others. Dec 61, 75p. incl. illus. tables, 48 refs.
(Contract DA 18-108-cml-6573)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: (*Skin, Rats, *Absorption, *Penetration, Amines, Benzenes, Organic acids, Urea, Glucose, Histology, Chromatographic analysis.) (Nutrition, Laboratory animals, Fatty acids, Vitamins, Lipids, Proteins, Privation.

Alterations in the skin of rats maintained on a fat-free (EFA-deficient) diet were studied by biological, chemical and physical techniques. Skin from EFA-deficient rats showed parakeratosis, acanthosis and hypertrophy of the sebaceous glands. The water diffusion rate and electrical conductivity of skin rose sharply after six weeks of feeding the EFA-deficient diet. Also, EFA-deficient skin was more permeable to organic acids, amino acids, glucose and urea than normal skin. The permeability of skin from rats on diets deficient in vitamins A, B(6) and C was not altered. Skin permeability did not change in cases of magnesium deficiency or when low or high protein diets were fed to rats. Treatment with olive oil and with petroleum ether caused a small increase in the permeability of skin to both water and ions. Experiments indicate that n-butylamine penetrates normal rat skin readily. (Author)

AD-272 774 Div. 16, 30
(TISTB/LH) OTS price $1.60

Rutgers U., New Brunswick, N. J.
SPECTRAL SENSITIVITY OF SMALL RETINAL AREAS.
Annual progress rept., 16 Jan 61-15 Jan 62,
by John Krauskopf. 15 Jan 62, 10p. illus.
(Contract DA 49-193-md-2128)
Unclassified report

DESCRIPTORS: (*Retina, *Color vision, Recording devices.) (*Eye, Physiology, Sensitivity, Stimulation, Visual threshold, Monochromatic light.) (*Optical images, Measurement.)

The measurement of the image forming properties of the human visual system by means of a photoelectric ophthalmoscope and retinal light distributions for bright bar targets 1.6 ft wide for pupil diameter ranging from 3-8 mm. are presented. Spatial frequency response functions for these pupil diameters are also given. These functions, which are independent of the target used to measure them, describe the image formation properties of the optics. The color appearance of small briefly presented monochromatic stimuli vary in color from flash to flash. The color mixer uses monochromatic stimuli obtained by selecting portions of a spectrum produced by passing white light through a replica grating. A model suitable for student use has been constructed. (Author)

AD-272 782 Div. 16
(TISTB/LH) OTS price $1.10

Washington U., St. Louis, Mo. School of Medicine.
THE EFFECT OF STRESSORS ON EEG ACTIVATION WITH PHOTIC STIMULATION.
Annual progress rept., 1 Aug 61-1 Feb 62,
by J. A. Stern. 5 Mar 62, 5p.
(Contract DA 49-193-md-2179)
Unclassified report

DESCRIPTORS: (*Light adaptation, Man, Physiology, Light, Stimulation, Stress (Psychology), Stress (Physiology).) (*Electroencephalography, Frequency analyzers.)

Seventy subjects were studied electroencephalographically during photic stimulation at various frequencies. The EEG recordings are being evaluated clinically for photic stimulation induced abnormalities as well as electronically using a frequency analyzer. Information is being collected on (1) medical history with major emphasis on central nervous system involvement (mental illness, head injury, convulsions, blackout and fainting spells, headaches, etc.); (2) response to photic stimulation - subjective experience to each frequency of photic stimulation used; and (3) performance on an embedded figure test (Witkin's format). (Author)

AD-272 853 Div. 16
(TISTB/LH) OTS price $1.00

Armour Research Foundation, Chicago, Ill.
TOXICOLOGY OF AURIN TRICARBOXYLIC ACID AND ITS ANTIDOTAL EFFECTIVENESS AGAINST BERYLLIUM.
Rept. for 1 Mar 60-31 Aug 61 on Health Hazards of Material and Radiation,
by Maurice E. King. Dec 61, 23p. incl. illus. tables, 8 refs. (Rept. no. ARF 3170-6)
(Contract AF 33(616)6947, Proj. 7165)
(ASD TR 61-674) Unclassified report

DESCRIPTORS: (*Beryllium poisoning, Countermeasures, Beryllium compounds, Toxicity, Laboratory animals, Feasibility studies.)

Monkeys and dogs were used in a series of studies designed to assess the ability of aurin tricarboxylic acid (ATA) to provide protection against acute beryllium poisoning. The acute LD(50) of ATA was found to be 344 mg/kg for monkeys and 164 mg/kg for dogs. Neither species exhibited significant hematological changes when given weekly ATA doses of 25 mg/kg over an 8-month period. The lethal intravenous dose of beryllium sulfate was 0.6 mg/kg for both dogs and monkeys, but the value increased to between 1 and 3 mg/kg when given by intratracheal injection. Acute toxic effects were not observed by either intravenous or intratracheal doses of suspensions of beryllium oxide. Treatment with ATA appeared to have therapeutic value in monkeys exposed to beryllium, but no significant response was observed in dogs. (Author)

AD-272 919 Div. 16
(TISTB/AW) OTS price $2.00

Minneapolis-Honeywell Regulator Co., Minn.
RESEARCH AND DEVELOPMENT ON CLOSED RESPIRATORY SYSTEM ACCESSORIES. MOLECULAR SIEVES FOR CARBON DIOXIDE ADSORPTION.
Rept. for 2 Jan-15 May 61 on Equipment for Life Support in Aerospace,
by T. L. Willard. Oct 61, 69p. incl. illus. tables, 11 refs.
(Contract AF 33(616)7270, Proj. 6373)
(ASD TR 61-527) Unclassified report

DESCRIPTORS: (*Closed cycle ecological systems, *Carbon dioxide, *Adsorption, Porous filters.) Space medicine.

Present means for carbon dioxide removal for manned space capsules impose serious weight penalties for long missions. A regenerable adsorber is considered which would employ molecular sieve material from which adsorbed CO(2) can be removed and expelled or recovered. One type of molecular sieve, Linde Type 5A, was studied experimentally. These studies prove the feasibility of using molecular sieves to control the CO(2) level in a space cabin and indicate how operating variables such as temperature, pressure, humidity, gas velocity, etc., affect the design of an adsorption unit. Recommendations are given for additional experimental work to investigate more fully certain variables which influence the ultimate configuration of the adsorption system. Data for the design of a regenerable adsorption bed is presented, along with sample calculations illustrating the use of the data in designing a sorption bed for a three-man, fourteen-day prototype test system. (Author)

17. METALLURGY

AD-272 561 Div. 17, 25
(TISTM/EJH) OTS price $3.60

Columbia U., New York.
THE ORDER DEPENDENT ELECTRICAL AND THERMAL RESISTIVITY OF Cu3Au.
Final technical rept., pt. 2, 22 Jan 58-21 Jan 61,
by Samuel D. Lindenbaum. 1 Feb 62, 31p. incl. illus. tables, 6 refs.
(Contract DA 30-069-ORD-2195)
(AROD rept. no. 1931:2)
Unclassified report

DESCRIPTORS: (*Copper alloys, *Gold alloys, *Phase studies, Phase transitions, Copper compounds, Gold compounds, *Molecular association, *Resistance, Electrical properties, Thermoelectricity, Mechanical properties, Elasticity, High temperature research, Theory.)

A novel method for the measurement of the variation of thermal resistivity with temperature on small specimens, together with the results of tests that establish the validity of the method, are described. The method is applied to the binary alloy Cu3Au over the temperature range 133 to 406 C. Measurements of the variation of electrical resistivity of the same material with temperature between 33 and 420 C, obtained by a conventional method, are also reported. Procedures for deducing the dependence of physical properties upon order from such observations are critically reviewed. It is shown that the behavior of thermal resistivity differs widely from that exhibited by length, Young's modulus and electrical resistivity. (Author)

AD-272 562 Div. 17, 25
(TISTM/EJH) OTS price $5.60

Keck, W. M., Lab. of Engineering Materials, Calif. Inst. of Tech., Pasadena.
A DELAY TIME IN THE ALPHA TO GAMMA TRANSFORMATION IN IRON,
by Olaf A. Boedtker and Pol Duwez. Mar 62, 55p. incl. illus. 2 refs. (Technical rept. no. 3)
(Contract Nonr-22030)
Unclassified report

DESCRIPTORS: (Metals, *Iron, Heating, Cooling, *Phase transitions, Transition temperature, Relaxation time, Austenite, Martensite, High temperature research, Thermodynamics, Mathematical analysis, Integral equations.) (Wire, Test methods, Laboratory equipment, Vacuum furnaces, Electronic circuits.)

Iron, containing a certain amount of C and N, was pulse-heated from an initial temperature in the alpha phase into a final temperature within the gamma phase. The bulk of the allotropic transformation took place a certain time after the final temperature had been reached. The relationship between this delay time and the final temperature follows an Arrhenius type rate equation with a heat of activation of 20,500 + or - 1400 cal/mole. The effect of the rate of heating on the alpha to gamma transformation temperature was also measured. It was shown that if the rate of heating is above about 14,000 C/sec, it is possible to heat iron from the alpha to the delta phase, without any intermediate transformation into gamma. (Author)

AD-272 614 Div. 17, 14, 25, 1
(TISTM/GEC) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
MEASUREMENTS OF TOTAL EMITTANCE OF SEVERAL REFRACTORY OXIDES, CERMETS, AND CERAMICS FOR TEMPERATURES FROM 600 DEGREES F TO 2,000 DEGREES F,
by William R. Wade and Wayne S. Slemp. Mar 62, 35p. incl. illus. table, 8 refs. (NASA Technical note D-998)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-998.

DESCRIPTORS: (*Refractory materials, Oxides, Chromium compounds, Aluminum compounds.) (*Ceramic materials, *Cermets, Silicon compounds, Carbides, Nitrides, Chromium compounds, Aluminum compounds, Oxides, *Flame spraying.) (*Heat resistant alloys, Nickel alloys, Chromium alloys, Iron alloys.) (High temperature research, Measurement of *Blackbody radiation.) (Temperature control, Supersonic planes, Hypersonics.) *Heat resistant paints.

Experimental measurements of total emittance

were presented for a variety of refractory materials believed to have possible use as temperature control surfaces for high supersonic and hypersonic aircraft. The following materials were studied: chemically oxidized inconel, CrO2 base paint, Al2O3 base paint, SiC ceramics, Si3N4 ceramic, Cr/Al oxide cermets, and flame-sprayed cermets. (Author)

AD-272 639 Div. 17, 30, 25
(TISTM/EJH) OTS price $1.60

Birmingham U. (Gt. Brit.).
THERMODYNAMICS OF ALLOYS (CALORIMETRY).
Final technical rept., 1 Dec 60-30 Nov 61,
by J. N. Pratt and A. W. H. Morris. 30 Nov 61, 9p. incl. illus. 4 refs.
(Contract DA 91-591-EUC-1641)
Unclassified report

DESCRIPTORS: (Alloys, *Tin alloys, *Liquid metals, Phase studies, Phase transitions, Enthalpy, *Thermodynamics, *Calorimeters, Laboratory equipment, Design.) Great Britain.

The construction of a Sn solution calorimeter designed for the investigation of enthalpies of alloy phase formation is discussed. Construction details, experimental procedure, data treatment, and initial test results are summarized. The apparatus consists of a 1 1/2 x 2 in. cylindrical Mo crucible which contains 220 g of liquid Sn. The crucible rests on an insulating support, completely surrounded by a Ni plated Cu jacket. The jacket is heated by 3 series-connected non-inductive Brightray heating elements wound on a vitreosil tube and 2 elements in alundum discs. Ni radiation shields provide insulation from the rest of the apparatus. Temperature control is accomplished with a saturable reactor proportional controller. Temperature in the bath is measured by a Cu-constantan thermocouple. A water cooled vacuum envelope encloses the calorimeter units allowing measurements under vacuum of 10 to the -5th power mm Hg.

AD-272 668 Div. 17, 26, 30
(TISTM/BRW) OTS price $17.50

Sheffield Corp., Dayton, Ohio.
ULTRASONIC GRINDING OF SUPER ALLOYS.
Interim engineering rept., Phase 2, 2 July 60-6 Nov 61 on Imposed High Frequency Vibrations and Their Effect on Conventional Grinding of High Thermal Resistant Materials,
by R. N. Roney and D. Giardini. Nov 61, 265p. incl. illus. tables, 96 refs.
(Contract AF 33(600)40122, Proj. 7-757)
(ASD TR 7-757, Vol. 5)
Unclassified report

DESCRIPTORS: (*Heat resistant alloys, Steel, Stainless steel, Chromium alloys, Cobalt Alloys, Molybdenum alloys, Nickel alloys, Titanium alloys, Vanadium alloys, Aluminum alloys, Machining, Processing.) (*Machine tools, *Grinders, Grinding wheels, *Ultrasonics, Vibration.) Test equipment, Instrumentation, Tests, Alloys.

Vibrations from 60 to 40,000 c were investigated for possible application to the vibration of grinding wheels. Most successful in performance was the wheel vibrating in the 20,000 c-frequency range. Benefits to conventional grinding were lower grinding temperature, lower power to grind, greater grinding ratios, no impairment to surface finish, and no impairment to mechanical properties such as cracks, fatigue or tensile strength, even though harder wheels than normal were used. (Author)

AD-272 683 Div. 17
(TISTM/BRW) OTS price $.75

Defense Metals Information Center, Columbus, Ohio.
MAGNESIUM-LITHIUM ALLOYS. A REVIEW OF CURRENT DEVELOPMENTS,
by P. D. Frost. 6 Feb 62, 19p. incl. illus. tables, 13 refs. (DMIC memo. no. 146)
Unclassified report

DESCRIPTORS: (Alloys, *Magnesium alloys, *Lithium alloys, Aluminum alloys, Zinc alloys, Phase studies, Crystal structure, Physical properties, Mechanical properties, Tensile properties.)

A brief review is presented of progress in the development of Mg-Li-base alloys. By virtue of the Li, which has a specific gravity of 0.53, they have lower densities than any commercial Mg alloy. Li markedly improves the ductility and workability of magnesium. Since they have approximately the same modulus of elasticity as Mg alloys, about 6.5 million psi, the alloys have a high ratio of elastic modulus to weight, making possible rigid, light structures. No Mg-Li alloys are in commercial production. (Author)

AD-272 686 Div. 17, 26
(TISTM/GEC) OTS price $5.60

Battelle Memorial Inst., Columbus, Ohio.
CAUSES OF MICROFLAWS IN HIGH-STRENGTH WELD METALS, THEIR EFFECTS, AND METHODS OF ELIMINATING THEM.
Final rept.,
by M. D. Randall, R. E. Monroe, and P. J. Rieppel. 31 July 61, 56p. incl. illus. tables.
(Contract DA 33-019-ORD-3402, Proj. 5B93-32-004)
(WAL TR 642.4/1) Unclassified report

DESCRIPTORS: (Metals, *Steel, Welding, Arc welding, Electron beams, Metal joints, *Welds, *Welded joints, Heat treatment.) (Tests, Mechanical properties, Tensile properties, Deformation, Fracture (Mechanics), Microstructure, Metallurgical analysis, Microphotography, Grains (Metallurgy), Microscopy, X rays.) Rocket cases.

A study was made of the causes of microdefects in high-strength steel welds, the effects of such microdefects on weldment performance, and the methods for eliminating such defects. Welds were deposited in air-melted and vacuum-melted 300M steel by the inert-gas-shielded, W-arc and electron-beam welding processes. Tension, bend, and impact tests were made of these weldments and base plate. Extensive metallographic examination and supplementary studies were made. It was determined that microdefects could cause low-load failure and that these defects occurred at temperatures near the alloy solidus temperature and were chemistry controlled; microsegregation of S, P and Si occurred in these welds; Si lowered elevated-temperature ductility and promoted hot cracking; and grain-boundary liquation of heat-affected zones occurred. (Author)

AD-272 693 Div. 17
(TISTM/LH) OTS price $14.50

Department of the Army, Wash., D. C.
HIGH ENERGY RATE METAL WORKING BIBLIOGRAPHY.

Final rept., 1 July 60-1 Jan 62.
1 Jan 62, 219p. (Rept. no. NA62H-46)
(Proj. ORD-241; In cooperation with Battelle Memorial Inst. and North American Aviation Inc., Columbus, Ohio)
Unclassified report

DESCRIPTORS: (*Bibliography, *Metals, *Explosive forming, Safety devices, *Alloys, Refractory materials, Hardening, Welding, *Machining, Theory, Gas ionization, Heat transfer, Shock waves.)

AD-272 697 Div. 17, 26
(TISTM/BRW) OTS price $2.60

Propellex Chemical Div., Chromalloy Corp., Edwardsville, Ill.
A STUDY OF EXPLOSIVE FORMING SELECTED REFRACTORY METALS.
Progress rept. no. 4, 1 Nov-31 Dec 61.
30 Jan 62, 16p. incl. illus.
(Contract NOw 61-0832-c)
Unclassified report

DESCRIPTORS: (Heat resistant alloys, *Refractory materials, Molybdenum alloys, Titanium alloys, Tungsten, Sheets, *Explosive forming.) (Deformation, Velocity, Measurement, Instrumentation, Magnets, Inductance, Coils, Electric potential, Voltage.) Alloys, Metals.

Effort was directed toward obtaining strain rates for the Mo-1/2 Ti alloy. Strain rate data were also gathered for W, but complete data reduction was not completed. To affirm the results of the strain rates derived from the inductance measurements of blank velocity, comparison tests were made on AM350 stainless steel blanks. This comparison consisted of 2 ambient shots to which post yield strain gages were attached. The strain rate information obtained was compared with the inductance measurements. The forming characteristics of W were investigated. The results of these tests, particularly those with 40% dynamite, were most encouraging. (Author)

AD-272 778 Div. 17, 26
(TISTM/BRW) OTS price $1.60

Sylvania Electric Products, Inc., Towanda, Pa.
DEVELOPMENT AND PRODUCTION OF IMPROVED MOLYBDENUM SHEET BY POWDER-METALLURGY TECHNIQUES.
Interim rept. no. 12, 1 Oct-30 Nov 61,
by Roger B. Bargainnier. 5 Feb 62, 12p. incl. table.
(Contract NOa(s) 60-6018-c)
Unclassified report

DESCRIPTORS: (Production, *Molybdenum, *Molybdenum alloys, Titanium alloys, Carbon alloys, Sheets, *Powder metallurgy.) (Controlled atmospheres, *Sintering, Hydrogen, Dissociation, Ammonia, Temperature, Vacuum furnaces, Tensile properties.) (Additives, Nitrogen, Oxygen, Carbon, Titanium compounds, Carbides, Oxides, Nitrides.) Alloys, Heat resistant alloys, Processing, Powder alloys, Powder metals, Hardening.

A powder-metallurgy Mo-Ti-C alloy with high-temperature properties superior to those of arc-cast Mo-0.5Ti-C was developed. These properties were obtained by a process which involved sintering in reducing atmospheres at about 2150 C. Although the properties can be reproduced, the process needs further study, and the mechanism which produces the superior properties should be determined. A rational explanation of the strengthening mechanism should lead to its rapid extension to other systems of refractory alloys. Important process variables include density of the sintered billet, reactive-metal and residual carbon content, composition of the sintering atmosphere, and sintering temperature. In comparison to alloy sheet produced by sintering at 1800 C in H, sheet of similar composition produced by sintering at 2150 C in either dissociated ammonia or H exhibit superior high-temperature properties. Vacuum sintering at 1700 and 2150 C confirmed the dependency of high-temperature sheet properties on the sintering temperature of the billet. (Author)

AD-272 779 Div. 17
(TISTM/EJH) OTS price $2.25

Southern Research Inst., Birmingham, Ala.
SIMULTANEOUS HEATING AND LOADING OF TYPE 321 STAINLESS STEEL AND STRAIN AGING OF COLUMBIUM AND TANTALUM.
Rept. for Mar 60-Mar 61,
by A. Clyde Willhelm. Dec 61, 171p. incl. illus. tables, 65 refs.
(Contract AF 33(616)7057, Proj. 0(7-7381))
(WADD TR 61-165) Unclassified report

DESCRIPTORS: (*Stainless steel, Heating, High temperature research, Loading, Thermodynamics.) (*Niobium, *Tantalum, Aging, Deformation, Elasticity, Fracture (Mechanics).) (*Sheets, Heat treatment, Stresses, Tensile properties, Mechanical properties, Failure (Mechanics), Theory, Mathematical analysis, Test methods.) (Aircraft, Materials, Refractory materials.)

The experiments were divided into two separate phases of investigation. In Phase I, a tensile machine supplied with improved methods of strain-rate control was used for determining the tensile properties of 0.060-in. Type 321 annealed stainless steel sheet under conditions of simultaneous heating and loading. Phase II experiments were performed on 0.030-in.-thick sheet specimens of annealed Nb and Ta to determine the effects of strain aging on the tensile properties of the two materials. The specimens were subjected to tensile loading at strain rates of 0.2, 0.05, 0.002, and 0.00008 in./in./sec over a range of temperatures from 100 to 2200 F. The results from Phase I provide a partial confirmation of the concept of a mechanical equation of state as shown by the close correlation between the experimental and predicted data. Both Nb and Ta exhibited strain-aging properties. Strain-aging effects were more pronounced in Nb. Several anomalous side effects are discussed. (Author)

AD-272 781 Div. 17, 26
(TISTM/BRW) OTS price $6.60

Universal-Cyclops Steel Corp., Bridgeville, Pa.
TUNGSTEN SHEET ROLLING PROGRAM.
Interim technical progress rept. no. 3 on Phase 3, 19 Oct 61-19 Jan 62,
by W. J. Schoenfeld. Feb 62, 61p. incl. illus. tables.
(Contract AF 33(600)41917)
(ASC TR 7-827, vol. 3)
Unclassified report

DESCRIPTORS: (*Tungsten, Sheets, Production, Processing.) (Rolling mills, Forging, Extrusion, Heat treatment, Temperature, Mechanical properties, Physical properties, Deformation, Thickness, Surface properties, Hardness, Microstructure.) Metals.

Progress is reported on a preliminary rolling study to determine the effects of rolling temperature and reduction on rollability and properties of W sheets. Preliminary work on InFab processing is discussed. From a rollability standpoint (i.e., material rolls satisfactorily without breaking up), initial rolling temperatures as low as 2300 F are satisfactory. Final rolling temperatures as low as 1800 F also proved satisfactory. The following ranges of processing parameters resulted in the lowest bend transition temperatures: (1) initial rolling at 2300 to 2500 F as compared to 2700 F, (2) reductions greater than 90% after recrystallization as compared to 80, 60, and 40%, and (3) maximum annealing temperature of 2000 F attributed to the initiation of recrystallization. Specimens were bent at 275 F which was the lowest temperature investigated. InFab forging of extrusions at 3000 to 4000 F proved satisfactory from a workability standpoint. (Author)

AD-272 799 Div. 17, 26, 27
(TISTM/BRW) OTS price $1.60

Lyon, Inc., Detroit, Mich.
DEEP DRAWN AUSFORMING DEVELOPMENT PROGRAM. 12-INCH DIA. ROCKET MOTOR CHAMBERS.
General rept. no. 3, for period ending 31 Jan 62,
by Wayne A. Martin. 31 Jan 62, 10p. incl. illus.
(Contract NOw 60-0634)
Unclassified report

DESCRIPTORS: (*Drawing (Machine processing), *Rocket cases, Austenite, *Steel.) (Processing, Manufacturing methods, Rocket motors, Combustion chambers, Heat treatment, Deformation, Plastic flow, Plasticity, Hardening, Temperature, Mechanical properties, Tensile properties.) (Tools, Dies, Design.)

Progress is reported on the ausforming of 12-in.-diam by 36-in. long deep-drawn 1-piece rocket motor chambers. Additional data for 51% reduction as a function of rolling temperature is presented and indicates that yield strengths in excess of 300,000 psi can be obtained with 51% reduction over an ausforming temperature range of 1000 to 1200 F. (Author)

AD-272 858 Div. 17
(TISTM/BRW) OTS price $1.60

Armour Research Foundation, Chicago, Ill.
FIBER-REINFORCED METALS AND ALLOYS.
Bimonthly rept. no. 5, 19 Dec 61-18 Feb 62,
by T. J. Koppenaal and N. M. Parikh. 26 Feb 62, 9p. incl. illus. table (Rept. no. ARF 2221-5)
(Contract NOw 61-0555-c)
Unclassified report

DESCRIPTORS: (*Alloys, *Metals with Reinforcing materials of Metallic textiles.) (*Aluminum and *Aluminum alloys, *Copper alloys, Powder alloys or Powder metals with Fibers of Stainless steel or Tungsten.) (Powder metallurgy, Extrusion, Mechanical properties, Tensile properties, Elasticity, Microstructure, Hardening.)

The mechanical properties of an Al-4% Cu matrix strengthened with type 304 stainless steel fibers (0.001-in. diam) are tabulated. The strength of the matrix was about doubled by the addition of 50 wt-% of fibers. An examination of the microstructure of transverse and longitudinal sections from the 40 wt-% composite failed to show a fiberous structure. The extrusion temperature may have caused the Fe in the 304 fibers to dissolve in the Al matrix. A composite with 40 wt-% type 304 stainless steel fibers (0.0002 in. diam) had an as-extruded yield strength of 36.1 ksi, the ultimate tensile strength was 40.0 ksi. A number of hot-extruded composites were prepared with powdered Al and W fibers (0.001 in. in diameter). The addition of 50 wt-% W fibers nearly tripled the yield strength of pure Al; swaging the as-extruded specimens produced further strengthening. Typical microstructures of the as-extruded 50 wt-% W are presented for transverse and longitudinal sections. Most of the fibers have their longitudinal axes parallel to the longitudinal axis of the composite. Microstructures of the 40 wt-% W composite after swaging to a 60% reduction in area showed the fibers with their longitudinal axes parallel to the longitudinal axis of the specimen. (Author)

AD-272 888 Div. 17, 14, 25
(TISTM/GEC) OTS price $1.60

Chance Vought Corp., Dallas, Tex.
ABSTRACTS OF MATERIAL EVALUATION PROGRAMS CONDUCTED AT CHANCE VOUGHT CORPORATION.
Semi-annual rept. no. 2, Phase 2, 1 Sep 61-15 Feb 62,
by J. J. Peterson. 28 Feb 62, 12p. (CVC rept. no. 2-53420/2R371)
(Contract AF 33(616)7986)
Unclassified report

DESCRIPTORS: (*Aluminum alloys, Fatigue (Mechanics), Stresses, Corrosion.) (Niobium alloys, Diffusion of *Ceramic coatings as Oxidation inhibitors.) (Magnesium alloys, Castings, Mechanical properties.) (Hydraulic systems, Metal seals, *Alloys.) (Nickel alloys, Sheets, *Heat resistant alloys.) (*Blackbody radiation, Zirconium compounds, Oxides.) (*Photoelastic materials, Coatings.) (*Glass textiles, Aircraft canopies.)

Contents: Biaxial fatigue tests of bare 7075-T6 Al, Diffusion coating process for Nb base alloys, Mechanical properties of AZ91C-T6 Mg castings, Materials evaluation for modular hydraulics systems, Development of a Ni base alloy sheet for high temperature applications, Vought emittance determinations, Development and evaluation of a high temperature photoelastic coating, Evaluation of stretched Plex 55 for airplane canopy applications, and Evaluation of 7075-T73 Al alloy.

AD-272 986 Div. 17
(TISTM/BRW) OTS price $1.60

Frankford Arsenal, Philadelphia, Pa.
SOME ELEVATED TEMPERATURE TENSILE PROPERTIES OF NONFERROUS ALLOYS MELTING IN THE RANGE 300 TO 1100 DEGREES F,
by L. M. Smith. Dec 61, 17p. incl. illus. tables, 9 refs. (Memo. rept. M62-13-1)
(Proj. TB4-002)
Unclassified report

DESCRIPTORS: (*Alloys, *Metals, Military requirements, Structures, *Bearings, High temperature research, Data, Melting, Tensile properties, Hardness.) (Lead, Tin,) (Tin alloys, Lead alloys, Aluminum alloys, Cadmium alloys, Magnesium alloys, Zinc alloys, Copper alloys, Antimony alloys, Silver alloys, Arsenic alloys.)

A survey was made to compile data on the elevated temperature properties of alloys melting in the range of 300 to 1100 F. A majority of the data pertained to Sn alloys with alloys of Pd, Al, Cd, Mg, and Zn. The elevated temperature tensile properties of 64 alloys and 2 pure metals are given. (Author)

AD-272 993 Div. 17
(TISTM/BRW) OTS price $1.60

Armour Research Foundation, Chicago, Ill.
CO-REDUCTION AND EXTRUSION CONSOLIDATION OF Mo-0.5Ti-0.1C ALLOY.
Quarterly progress rept. no. 1, 27 Apr-27 Aug 61, by John J. Rausch and C. R. Simcoe. 23 Aug 61, 8p. illus. (Rept. no. ARF 2224-1)
(Contract NOw 61-0548-c; Continuation of Contract NOa(s) 60-6019-c)
Unclassified report

DESCRIPTORS: (Alloys, Metals, *Powder alloys, Powder metals, *Molybdenum alloys, Titanium alloys, Carbon alloys, Processing.) (Preparation by Magnesium, Reduction and Extrusion from Mixtures, Molybdenum compounds, Titanium compounds, Carbon compounds, Chlorides.) (Laboratory equipment, Design, Operation.)

Previous results indicated the feasibility of the co-reduction of a mixed chloride feed to produce an alloy of Mo-Ti-C. However, a number of problem areas exist which require further research effort before large-scale production is warranted. These include (1) control of impurity levels in the final product, (2) determination of optimum operating conditions for the reduction process, and (3) effective removal of reaction by-products. New equipment is being designed which incorporates improved design features based upon experience with the 40-lb capacity reactor previously employed. Reactors of improved design with capacity of up to 10 lb of Mo are under construction along with a separate distillation unit and improved vacuum and dry-box facilities to enable complete inert atmosphere handling of materials. The new reactors will also be capable of producing sufficient powder for the extrusion-consolidation phase of the program. (Author)

AD-272 997 Div. 17, 26
(TISTM/GEC) OTS price $1.60

Solar Aircraft Co., San Diego, Calif.
DEVELOPMENT OF LOW TEMPERATURE BRAZING OF TUNGSTEN FOR HIGH TEMPERATURE SERVICE.
Interim rept. no. 5, 16 Nov 61-15 Jan 62, by C. W. Haynes. 15 Feb 62, 10p. incl. illus. tables, 4 refs. (Rept. no. RDR-1249-5)
(Contract NOw 61-0414-c)
Unclassified report

DESCRIPTORS: (Refractory materials, *Tungsten, *Brazing, Silver solders.) (Soldering alloys, Platinum alloys, Boron alloys, Additives, Powder metals, Tungsten.) (Metal joints, Welded joints, Diffusion, Heat treatment, Thickness.) (Tungsten compounds, Borides, Additives, Foils, Titanium, Zirconium, Tests, Shear stresses, X-ray diffraction analysis.)

The effects of variations in brazing cycle, tungsten powder addition, and diffusion treatment on the temperature required to cause joint separation at 800 psi shear stress were determined for lap joints brazed with Pt-2.15B alloy. Further evaluation of optimum joint thickness has been made. (Author)

18. MILITARY SCIENCES AND OPERATIONS

AD-272 845 Div. 18, 30
(TISTW/EET) OTS price $3.60

Planning Research Corp., Los Angeles, Calif.
CONSIDERATIONS IN THE DESIGN OF A TEAS SIMULATION RESEARCH FACILITY,
by Hawley A. Blanchard. 1 Nov 61, 31p. incl. illus. 7 refs. (Rept. no. PRC R-195; Scientific rept. no. 5)
(Contract AF 19(604)7351)
(AFCRL-1113) Unclassified report

DESCRIPTORS: (*Military operations, *Air force operations, Display systems, Data processing systems, Command systems, Control systems, Warfare, Simulation, *Test facilities, Laboratory equipment, Human engineering, Costs, *Operations research.)

A discussion concerning the implementation and the concomitant costs of a simulation research facility for conducting research into the concepts and techniques of a TEAS activity is presented. Among the simulation laboratory considerations discussed are the need for such a facility, the space requirements, the laboratory equipment needs, and environmental considerations. Some thoughts are presented on the operation and scheduling of simulation laboratory use. The implementation of a hypothetical simulation laboratory is then treated, followed by a tabulation of estimated costs. It is concluded that such a facility is essential to the successful development of a TEAS complex; however, successful use of a TSRF is by no means assured in view of the ambitious nature of the activity of which TEAS is to be representative. Information on simulation facilities currently engaged in activities related to TEAS is included. (Author)

19. NAVIGATION

AD-272 776 Div. 19, 33
(TISTP/WH) OTS price $10.10

Stanford Research Inst., Menlo Park, Calif.
THE FEASIBILITY OF THE USE OF MINIMUM TIME TRACK DATA IN AIRWAYS DESIGN.

Final rept.,
by Sidney M. Serebreny, Eldon J. Wiegman, and Rex G. Hadfield. Sep 61, 114p. incl. illus. tables.
(Contract FAA/BRD-236)
Unclassified report

DESCRIPTORS: (*Air traffic, *Flight paths, Air transportation, Navigation, Meteorology, Wind, Climatic factors.)

Five U. S. air routes (San Francisco - New York, Los Angeles - Chicago, New York - Miami, Chicago - Miami, and Denver - Chicago) are considered. A total of 2,000 minimum time tracks taken from five winter seasons were analyzed. From this data sample, characteristic distributions, configurations, and frequencies are delineated, using two altitude-airspeed combinations (18,000 ft - 250 knots and 30,000 ft - 500 knots). Minimum time track data at 53,000 ft using an airspeed of 1750 knots are presented for the San Francisco - New York route. Results indicate that networks of fixed tracks can be derived that preserve the major benefits of minimum time track usage. The complexity of the network required varies with the length and orientation of the route. Effects of severe weather can be minimized through inclusion of sufficient route options within the derived network. (Author)

20. NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

AD-272 535 Div. 20
(TISTP/MFA) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
CONCERNING THE DISCOVERY OF THE PRINCIPLE OF THE PULSE REACTOR,
by K. Fuchs. 2 Feb 62, 6p. (Trans. no. FTD-TT-62-30 of Kernenergie, no. 9:pp. 685-687, 1961)
Unclassified report

DESCRIPTORS: (*Research reactors, Pulse transmitters, Fast reactors, Critical assemblies, Supercritical assemblies, Neutrons, *Neutron flux density, *Fission neutrons, Heat transfer, Fission products, Nuclear energy.) USSR.

A critical experiment was made, in which fissionable material for fast neutrons was assembled in a critical installation, thus causing a supercritical situation to occur. The change in the criticality of the installation was caused by the geometrical change in the installation and by the thermal expansion induced by the fission energy. The conditions of the experiment were such that the following assumptions could be made: (1) The rate of change in criticality is large enough so that heat transfer can be neglected. (2) The rate of the geometrical change in the installation is small enough so that the rate of the criticality change caused by the geometrical change is small in comparison with the rate of change of the neutron flux, at least at the decisive moment when the neutron pulse reaches its maximum. (3) The excess criticality is small enough so that the time delay between the fission and the thermal expansion resulting from the liberated energy can be neglected. In addition, delayed neutrons were neglected. (Author)

AD-272 546 Div. 20
(TISTP/FR) OTS price $3.60

Air Force Special Weapons Center, Kirtland Air Force Base, N. Mex.
THE TRANSPORT OF NEUTRONS THROUGH THE ATMOSPHERE FOR A BURST HEIGHT OF 500,000 FEET,
by Alexander E. Anthony, Jr. and Eugene Omoda. Feb 62, 35p. incl. illus. tables, 5 refs.
(Rept. no. SWC TDR 62-17)
(Proj. 7806)
Unclassified report

DESCRIPTORS: (Nuclear explosions, Neutron scattering, High altitude, *Neutrons, Neutron flux density, Density, Measurement.) (Nuclear explosions, Neutrons, *Propagation through Atmosphere.)

A series of curves is presented showing the scattered and direct neutron flux per initial neutron from a burst height of 500,000 feet and sampling altitudes of 100,000, 200,000, 500,000, and 1,000,000 feet. The scattered flux data were calculated from a Monte Carlo Code developed at the RAND Corporation. The direct flux data were calculated by the inverse square method. These data may be used to determine the following: (a) the fraction of the flux or dose attributable to the neutrons of various initial energies and selected energy bands; (b) the total flux or dose due to the scattered neutrons; (c) the total flux or dose due to the unscattered neutrons; and (d) the total flux or dose arriving at a designated distance in space from a nuclear detonation at 500,000 feet. (Author)

AD-272 797 Div. 20
(TISTB/LH) OTS price $8.10

Lockheed Aircraft Corp., Sunnyvale, Calif.
SCATTERING IN ION-ATOM AND ATOM-ATOM COLLISIONS: AN ANNOTATED BIBLIOGRAPHY,
comp. by George E. Owens. Jan 62, 81p. (Special research bibliography no. SRB-62-1; Rept. no. 6-90-61-92)
Unclassified report

DESCRIPTORS: (*Scattering, *Transport properties, Differential cross section, *Atoms, *Ions, Electrons.) (Nuclear energy, Nuclear reactions, Thermonuclear reactions.) *Bibliography.

AD-272 809 Div. 20, 25
(TISTM/EJH) OTS price $10.10

United Nuclear Corp., White Plains, N. Y.
NEUTRON CROSS SECTIONS FOR TITANIUM, POTASSIUM, MAGNESIUM, NITROGEN, ALUMINUM, SILICON, SODIUM, OXYGEN, AND MANGANESE.
Final rept. 20 Mar 61-31 Jan 62,
by N. Tralli, M. H. Kalos and others. 31 Jan 62, 115p. incl. illus. tables, 79 refs. (Rept. no. UNC-5002)
(Contract DA 18-108-405-cml-1011, Proj. 2168)
Unclassified report

DESCRIPTORS: (*Neutron cross sections, *Titanium, *Potassium, *Magnesium, *Nitrogen, Aluminum, Silicon, Sodium, Oxygen.) (Neutrons, Scattering, Gamma rays.) Tables.

A set of neutron cross sections for Ti, K, Mg, and N were prepared for neutrons energies from 0.0253 ev to 18 Mev. A revision of some of the

neutron cross sections for Al, Si, Na, and O given in NDA 2111-3, Vol. C, Nov. 1, 1959 and NDA 2133-4, Jan. 31, 1961 was made based on experimental results which appeared in the literature since the publication of these reports. In addition, some typographical errors in the tabulation (n,n) cross sections for Mn in NDA 2133-4 are corrected. The results of Hauser-Feshbach calculations of reactions of O-16 are reported. (Author)

AD-272 871 Div. 20
(TISTP/FR) OTS price $7.60

Nuclear Defense Lab., Army Chemical Center, Md.
ATTENUATION OF SIMULATED FALLOUT RADIATION BY THE ROOF OF A CONCRETE BLOCKHOUSE,
by Murray A. Schmoke and Ralph E. Rexroad.
Aug 61, 71p. incl. illus. tables, 5 refs. (Rept. no. NDL-TR-6)
Unclassified report

DESCRIPTORS: (*Shelters, Concrete, Roofs, *Gamma rays, *Penetration, Measurement, Tables.) (Radioactive isotopes, Cobalt, Cesium.) (Air raid shelters, Radioactive fall-out, Gamma rays, Penetration.)

Theoretical calculations of the effect of roof thickness on the radiation level inside a concrete blockhouse from a plane of gamma radiation on the roof of the building were experimentally verified. Two gamma emitters, cobalt-60 and cesium-137, were used to simulate uniform planes of radiation. The dose rates at various locations within the blockhouse were measured with ionization-chamber dosimeters. Reduction factors were calculated from the data and compared with theory. (Author)

AD-272 918 Div. 20, 15
(TISTP/MFA) OTS price $9.10

General Dynamics/Fort Worth, Tex.
ANGULAR SEGMENTATION METHOD,
by N. Edmonson and L. M. Bostick. 28 Feb 62, 107p. incl. illus. table, 8 refs. (Document no. FZK-9-172; NARF-61-43T)
(Contract AF 33(657)7201)
Unclassified report

DESCRIPTORS: (*Elastic scattering and *Transport properties of Nuclear reactions in Water.) (Shielding, Neutrons, *Neutron flux density, Nuclei, Fission, Nuclear energy.) (Differential cross section, Differential geometry, Operators (Mathematics), Polynomials, Functions.) *Tables.

The angular segmentation method for calculating numerical approximations to solutions of the Boltzmann transport equation is developed for a spherically symmetric shield system. Anisotropic elastic scattering is assumed. Energy-group transfer coefficients are developed by using the Dirac function. A general matrix formulation for the anisotropic case is constructed. These procedures are applied to the computation of angular neutron distributions and total neutron distributions. (Author)

AD-272 959 Div. 20
(TISTP/WH) OTS price $6.60

Nuclear Defense Lab., Army Chemical Center, Md.
SCATTERED RADIATION AND FREE-FIELD DOSE RATES FROM DISTRIBUTED COBALT-60 AND CESIUM-157 SOURCES.
Rept. July 58-Jan 59 on Protection Against Radiological Hazards,
by Ralph E. Rexroad and Murray A. Schmoke.
Sep 60, 64p. incl. illus. tables, 12 refs.
(Rept. no. NDL TR-2)
Unclassified report

DESCRIPTORS: (*Gamma rays, *Contamination, *Dose rate.) (Gamma rays, Simulation, Cobalt, Cesium, Radioactive isotopes.) (Instrumentation, Ionization chambers, Dosimeters.) Shielding.

The purpose of this analysis was to verify theoretical calculations that will predict the radiation level above a uniformly contaminated plane of gamma radiation and serve as the open-field data for later shielding experiments. Two sources, cobalt-60 and cesium-137, were used to simulate the uniformly contaminated plane. The dose rates at various heights above the source plane were measured with ionization-chamber dosimeters. Analytical expressions of the buildup factor to account for the increase in dose caused by scattered radiation were developed, and experimental results compared with theory. The conclusions are summarized. (Author)

21. NUCLEAR PROPULSION

No Entries

22. ORDNANCE

AD-272 596 Div. 22
(TISTW/JRG) OTS price $12.00

Broadview Research Corp., Burlingame, Calif.
EFFECTS OF TOPOGRAPHY ON DYNAMIC PRESSURE.
Interim rept. no. 1, June 60-Aug 61,
by N. R. Wallace and A. B. Willoughby. Oct 61, 195p. incl. illus. 16 refs. (Rept. no. BRC 170-7)
(Contract DA 49-146-xz-050)
(DASA-1262) Unclassified report

DESCRIPTORS: (RDX, *Explosions, *Blast, *Shock waves, *Pressure, Measurement, Pressure gages, Terrain, Configuration, Terrain models, Model tests, Test equipment.) (*Nuclear explosions, Simulation.)

An experimental study of the effects of idealized

topography on the dynamic pressure of a spherically expanding air shock is described. Model-scale techniques were used in which small charges of desensitized cyclonite were exploded in reduced ambient pressure to increase the effective weight of the charge through Sachs's scaling. Model topographies studied were symmetrical, 2-dimensional ridges and valleys. Slope angles of 15 and 30 degrees and shock strengths of 2, 4, and 8 were examined. Measurements of stagnation, side-on, and dynamic pressure were made on the front and back slopes and in the flat region behind each modeled topography. (Author)

AD-272 619 Div. 22, 12
(TISTW/EET) OTS price $1.60

Ordnance Mission, White Sands Missile Range, N. Mex.
LITTLEJOHN XM-34 LAUNCHER EXPERIMENTAL STRESS ANALYSIS,
by J. W. Goodwin and G. A. Adams. Feb 62, 12p. incl. illus. table, 3 refs. (Technical memo. no. 962)
Unclassified report

DESCRIPTORS: (Simulation of *Stresses, Analysis on *Rocket launchers during Transportation over Roads.) (Rocket launchers, Structures, *Coatings, Fatigue (Mechanics), Strain gages, Calibration, Tests.) Rockets, Surface to surface.

An experimental stress analysis was performed on the Littlejohn XM-34 launcher while it was experiencing simulated road transportation shocks. The tests were conducted at White Sands Missile Range, New Mexico, during July 1961. No failures resulted from the tests. (Author)

AD-272 678 Div. 22
(TISTW/JRG) OTS price $5.60

Harvey Aluminum Sales, Inc., Torrance, Calif.
PRODUCTION ENGINEERING OF METAL PARTS FOR FUZE, BOMB, NOSE, M904E1(Ex-T709E4).
Summary rept.
29 Sep 61, 1v. incl. illus. (Rept. no. HA-1592)
(Contract DA 28-017-501-ORD-2396, Proj. PA-6-8 and PA-6-9)
Unclassified report

DESCRIPTORS: (*Bomb fuzes, *Nose fuzes, Tail fuzes, Time delay fuzes, Impact fuzes, Fuzes, Design, Production, Tests.)

AD-272 681 Div. 22
(TISTW/JRG) OTS price $7.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
MECHANICS OF CRATER FORMATION IN SAND AND CLAY PRODUCED BY UNDERGROUND EXPLOSIONS,
by W. H. Townsend, Mark Langseth, and B. Perkins, Jr. Dec 61, 80p. incl. illus. (BRL Memo. rept. no. 1381)
(Proj. 503-04-002)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: (*Underground explosions, Blast, *Cratering, *Sand, *Clays, Tests, Test methods.) (Sand, Clays, Particles, Acceleration, Measurement.)

Studies of crater dimensions vs shot depth were made for sand and clay. By using a colored-column technique, true crater dimensions and depths were measured. Mineral and moisture content were held nearly constant. Shear strength, grain size, soil density, cohesion and plasticity were measured. Accelerations of the ground particle vs distance were measured for shot depths varying from zero to 2 units of scale distance. The values of the acceleration at a given distance from successive explosions at the same depth had an av deviation from the mean value of approximately 25% for both sand and clay. The av deviation of the crater dimensions was less than 10% from the mean for sand and less than 5% for clay. (Author)

AD-272 689 Div. 22, 2
(TISTW/EET) OTS price $2.60

Army Signal Missile Support Agency, White Sands Missile Range, N. Mex.
SURFACE WIND MODEL FOR UNGUIDED ROCKETS USING SPECTRUM AND CROSS-SPECTRUM TECHNIQUES,
by Henry Rachele. Jan 62, 19p. incl. illus. tables, 11 refs. (Technical rept. no. 117)
Unclassified report

DESCRIPTORS: (*Mathematical analysis, *Wind, *Sounding rockets.) Instrumentation, Data processing systems, Tables, Least squares method.

Power Spectrum, Cross-Spectrum, and Least Squares Techniques are used for determining representative surface wind fields minutes prior to and during the firing of high altitude unguided sounding rockets. A definition of a representative wind field, the derivation of the model, and an example field are presented. (Author)

AD-272 811 Div. 22
(TISTW/RD) OTS price $8.60

Atlantic Research Corp., Alexandria, Va.
STUDY AND ANALYSIS OF MEDIUM MORTARS.
Final rept., 18 July 60-30 June 61,
by D. D. Dunfee and T. J. O'Donnell. Oct 61, 94p. incl. illus. tables.
(Contract DA 30-144-503-ORD-1288, Proj. 5W01-13-029)
Unclassified report

DESCRIPTORS: (Tests of *Mortars.) (Instrumentation, Strain gages, Calibration, Accelerometers.)

The program of test firing for the medium mortars M29 and T227E2 is described. The range facilities, instrumentation and planned statistical test program are also discussed. The data obtained from test groups completed are included and sample firing traces are shown. An analysis of the data is presented in which the recorded phenomena are interpreted and related to potential design and performance parameters and problems. (Author)

AD-272 873 Div. 22
(TISTW/JRG) OTS price $1.10

Measurement Systems, Inc., Norwalk, Conn.
QUANTUM DETECTOR FOR MEASUREMENT OF EED BRIDGE WIRE TEMPERATURE RISE.
Monthly progress rept. no. 8, 1-28 Feb 62.
1 Mar 62, 6p. incl. illus. (Rept. no. ER-7038)
(Contract N178-7934)
Unclassified report

DESCRIPTORS: (*Electric igniters, *Electric detonators, Electric bridges, Temperature, Determination, Electric wire, Electromagnetic effects, Hazards, *Temperature warning systems, Detectors, Optical equipment, Design.)

Work is continuing on the construction and testing of an experimental model quantum detector. Consideration is given to the design and breadboarding of a low-noise, low-signal amplifier and an oscillator for the vibrating reed chopper. The amplifier was designed with a high input impedance to avoid loading the detector. (Author)

AD-272 989 Div. 22, 26
(TISTW/JRG) OTS price $1.10

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
A RADIOTRACER NON-DESTRUCTIVE TEST FOR THE PRESENCE OF FOUR SPRINGS IN A SEALED T1029 E2 FUZE ASSEMBLY,
by Cecil G. C. White, James W. McCahill, and Richard J. Graybush. June 61, 7p. incl. table. (Technical note no. FRL-TN-76)
Unclassified report

DESCRIPTORS: (*Non-destructive testing, *Radioactive isotopes, Gamma rays, Detection, Neutron detectors for Quality control, Wire, *Springs, *Projectile fuzes, *Fuzes.)

The problem of detecting the presence of 4 springs in a sealed T1029E2 fuze assembly involves the quantitative detecting measurement of gamma radiation emitted from the springs tagged with some suitable radioactive isotope. Since the total activity coming from a completely assembled item is to be a multiple of the activity of one spring it becomes necessary to choose a tagging method which would make it possible to impart a reproducible activity to each spring; this could be accomplished in the following ways by: (1) coating with a radioactive agent, such as paint or ink; (2) plating with some compatible radioactive material; or (3) neutron activation. It was concluded from preliminary tests that the method of neutron activation is capable of indicating the absence or presence of 1 to 4 springs in a sealed assembly. With the use of a suitable detector and corresponding electronic equipment, this non-destructive method of testing for the presence of component parts in a sealed fuze assembly can be completely automated. (Author)

AD-272 990 Div. 22, 18
(TISTW/JRG) OTS price $1.60

Frankford Arsenal, Philadelphia, Pa.
EXPERIMENTAL LONG TERM STORAGE REPORT TEARDOWN INSPECTION OF M8 RECOIL MECHANISMS FOR 240 mm HOWITZER AT ROCK ISLAND ARSENAL, NOVEMBER 1958,
by W. J. Shields. Dec 61, 18p. incl. illus. (Memo. rept. no. M62-12-1)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: (Ordnance, *Storage, Humidity, Deterioration, Tests, *Howitzers, *Recoil mechanisms, Corrosion.)

Examination of six M8 recoil mechanisms, removed from 240 mm howitzers after 14 yr of storage in air maintained at 40% RH max, revealed all of the mechanisms to be in an excellent state of preservation. Externally, there was no evidence of deterioration. Internally, light rust was found on the recoil and counterrecoil rods and recuperator valves of all units. Since the rust was readily removable by wiping with a soft cloth, the serviceability of the recoil mechanisms would not be impaired. The cause of this superficial rusting was not determined. Laboratory analysis indicated that oil and grease samples removed from the units were found to meet all of the originally specified requirements. The coil springs in 2 of the floating pistons, in separate units, were found broken. (Author)

23. PERSONNEL AND TRAINING

AD-272 687 Div. 23
(TISTB/AW) OTS price $10.10

Naval Personnel Research Field Activity, San Diego, Calif.
ANNOTATED BIBLIOGRAPHY OF ADULT READING STUDIES. Rept. for 1950-1960,
by Lloyd S. Standlee and Eugene A. Hooprich. Oct 61, 126p. 400 refs. (Technical bulletin no. 61-15)
Unclassified report

DESCRIPTORS: (*Bibliography, *Reading, Education, Training.)

This report documents and briefly summarizes information concerning the teaching of advanced reading skills to adults. The search of professional literature (mostly psychological and educational journals) yielded 400 references that were published during the 10 year period, 1950 to 1960. Of these, 384 were located and abstracted. Almost without exception, adults in reading improvement programs were reported to have achieved considerable increases in reading speed, typically 100 per cent or more, with some gain in comprehension. About 70 per cent of the reading speed gain was retained when subjects were tested six months to two years after training. It is concluded that the Navy could increase the reading speed of its personnel significantly, conceivably by as much as 100 per cent or more, with the establishment of a reading improvement program. (Author)

AD-272 975 Div. 23
(TISTB/LH) OTS price $2.25

Psychological Research Associates, Inc., Arlington, Va.
DEVELOPMENT OF HUMAN PROFICIENCY AND PERFORMANCE MEASURES FOR WEAPON SYSTEMS TESTING.
Rept. for Mar-July 61, on Technical Guides for Designers of the Personnel Subsystem for New Weapon Systems,
by Melvin R. Marks. Dec 61, 85p. incl. illus. tables, 13 refs.
(Contract AF 33(616)7464, Proj. 7190)
(ASD TR 61-733) Unclassified report

DESCRIPTORS: (*Military personnel, Weapons, Handling.) (*Job analysis, Effectiveness, *Achievement tests.)

Methods for evaluating human performance are discussed and compared for validity, reliability, objectivity, standardization, and economy. Personnel Subsystem test development constraints are considered and methods are proposed for the construction, scoring, administration and standardization of measurement instruments. Appendices are included which exhibit sample content, sample computation and definitions of terms of the Personnel Subsystem. (Author)

24. PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

AD-272 585 Div. 24, 2
(TISTA/VGW) OTS price $8.60

Syracuse U. Research Inst., N. Y.
INVESTIGATION OF ATMOSPHERIC REFRACTION AND FILM SHRINKAGE,
by Robert H. Brock and Arthur H. Faulds. Nov 61, 1v. incl. illus. (Rept. no. CE-743-6110 F)
(Contract AF 30(602)2155, Proj. 6258)
(RADC TR 61-301) Unclassified report

DESCRIPTORS: (*Aerial photographs, *Photographic analysis of Errors in Measurement from Distortion of *Photographic film and Refractive properties of Atmosphere, Upper atmosphere, *Atmospheric refraction, Mathematical analysis, Tests, Mathematical prediction, Tables, Atmosphere models.)

An investigation was initiated of the errors in aerial photography due to atmospheric refraction and film shrinkage. Tables for atmospheric refraction were computed for varying altitudes ranging from 2,000 to 5,000,000 feet. These computations were based on the theory developed in an earlier technical report (AD-272 586) during this study. The film shrinkage study included calibrating a base grid, exposing the base grid on two types of film, measuring the shrinkages of the film, and reducing the data both graphically and analytically. (Author)

AD-272 632 Div. 24, 2
(TISTA/VGW) OTS price $4.60

Howell, W. E., Associates, Inc., Lexington, Mass.
REPORT OF PHOTOGRAMMETRY OF CLOUDS FROM FIXED CAMERA SITES ON THE GROUND,
by Manuel E. Lopez. 30 Dec 61, 42p. incl. illus. tables, 3 refs. (Scientific rept. no. 2)
(Contract AF 19(604)7281, Proj. 6698)
(AFCRL-62-229) Unclassified report

DESCRIPTORS: (*Meteorology, *Photographic analysis of *Clouds using Aerial cameras, Surface to air, Camera mounts, Stereoscopes, Mapping, Effectiveness, Errors for Wind, Atmosphere, Motion, Shear stresses, Tests.)

A project is under way to relate patterns of cloud form and motion to physical properties of the atmosphere. This report summarizes computing and observing methods used for mapping cloud patterns from stereoscopic pairs of photographs taken from the ground. The observing set-up is described, the geometry of standard photogrammetric analysis is adapted to the purpose at hand, and methods are developed for applying corrections for unknown orientation errors of the cameras based on control points appearing in the photographs. Sources of error are considered, and the difficulty in following a given cloud detail through a sequence of photographs with certainty as to its identity and position, is shown to be the limiting factor in measuring cloud motions. Comments are made on the measurement of wind shear near the clouds by tracer techniques. (Author)

25. PHYSICS

AD-272 532 Div. 25
(TISTP/MFA) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A METHOD FOR STUDYING HEAT TRANSFER IN AN INTERMITTENT GASDYNAMIC PROCESS,
by Yu. A. Polyakov and Ye. A. Mit'kina.
12 Feb 62, 14p. incl. illus. 6 refs. (Trans. no. FTD-TT-62-69 from A paper presented at the Heat Transfer Conference, June 5-10, 1961, at Minsk, USSR)

Unclassified report

DESCRIPTORS: (*Heat transfer, Thermal conductivity of *Gas flow, Shock waves in *Shock tubes, Plasma physics, Electric discharges.) (*Transducers, Thin films, Glass, Dielectrics, Platinum.) USSR.

Two principles for measuring intermittent heat flows were developed: the calorimetric method, and a method of determining heat flows from the nonsteady-state temperature of the surface by using film transducers. In the experimental study of heat transfer under conditions of supersonic intermittent flow in a shock tube, the preferred method of determining heat flows and surface temperature from the nonsteady-state temperature was by using a film transducer. Since the validity of determining heat flows according to formulas for a semi-bounded body is associated with the influence of the surface measuring film or plate on heat transfer, the method theory reduces to solving and analyzing the problem of heat propagation through a system of two bodies: a film similar to an infinite plate, and a backing, a semi-bounded rod, for a short experiment time. (Author)

AD-272 533 Div. 25, 14, 17
(TISTM/GEC) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A METHOD OF DETERMINING THE THERMOPHYSICAL CONSTANTS OF MATERIALS AT HIGH TEMPERATURES,
by G. N. Tret'yachenko and L. V. Kravchuk.
12 Feb 62, 14p. incl. illus. 4 refs. (Trans. no. FTD-TT-62-68 from a Paper presented at the Heat Transfer Conference, June 5-10, 1961, at Minsk, USSR)

Unclassified report

DESCRIPTORS: (*Thermodynamics, *Cermets, *Refractory materials, High temperature research.) (Measurement, Thermal diffusion, Heat transfer, Thermal conductivity, Specific heat, Rings, Wedges, Cylindrical bodies.) (Galvanometers, Optical instruments, Pyrometers.) Physical properties.

A method is described for measuring thermophysical constants, and their dependence on temperature, of materials designed for operating in a gas flow having high speed and temperatures. The method makes it possible to measure the constants of materials whose properties change considerably from sample to sample, because of the technological difficulties involved in production, and also with time. Tests can be run on samples that have shapes similar to production parts, or on the parts themselves, e.g., a turbine blade, which is a twisted wedge. Measurements can be made directly on stands designed for investigating properties of cermets such as heat resistance to oxidation, erosion directly in engines. The thermal constants at temperatures above 1000 can be determined. Graphs of the thermophysical constants vs temperature are presented. (Author)

AD-272 540 Div. 25
(TISTP/MFA) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE CONTEMPORARY STATE OF THE QUESTION OF HEAT EXCHANGE IN RAREFIED GASES,
by A. N. Devoyno. 31 Jan 62, 17p. incl. illus. 11 refs. (Trans. no. FTD-TT-61-202 of Inzhenerno-fizicheskiy Zhurnal 4, no. 2:pp. 119-130, 1961)

Unclassified report

DESCRIPTORS: (*Superaerodynamics, Gas flow, *Low pressure research, Thermal conductivity, Convection, Transport properties, *Thermal diffusion, *Heat transfer, Kinetic theory.) USSR.

The problem of heat exchange at low pressure is treated. The following deviations from the classical method of studying heat exchange are presented: (1) as the characteristic dimension used in calculating the Grashof criterion, the authors took the distance equal to the sum of the diameter of the specimen and twice the mean free-path length of the molecules; and (2) they used the concept of an equivalent layer of a stationary gas possessing the same resistance to heat exchange as the convective boundary layer. (Author)

AD-272 545 Div. 25
(TISTP/MFA) OTS price $7.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
SYSTEMS OF UNITS AND CONVERSION TABLES,
by Max Kinslow and Betty M. Majors. Feb 62, 68p. incl. tables, 25 refs. (Rept. no. AEDC TDR 62-6)
(Contract AF 40(600)800)

Unclassified report

DESCRIPTORS: (Handbooks of *Physical properties, Measurement.) *Tables, *Bibliography.

Some fundamental concepts of units, dimensions, and physical measurements are discussed, and illustrations of the misunderstandings that exist in the literature concerning these concepts are given. The differences between measure and physical equations are outlined, and a simple example is considered. The choice of how many and which units to use as basic is shown to be completely arbitrary, and the choice is usually made to produce maximum accuracy and convenience. Various mechanical, thermal, and electrical systems of units in common use today are presented, and an engineering (ft-lbf-amp-sec) system is developed to describe electromagnetic problems. The history of some important physical units is traced, and the latest definitions of these units are used to obtain convenient conversion tables for various physical quantities. (Author)

Division 25 - PHYSICS

AD-272 549 Div. 25
(TISTP/WH) OTS price $4.60

Illinois Inst. of Tech., Chicago.
ELASTIC-PLASTIC ANALYSIS OF A ROTATING CYLINDER,
by Philip G. Hodge, Jr. and Martin Balaban.
Jan 62, 41p. incl. illus. table (DOMIIT rept. no. 1-15)
(Contract Nonr-140604)
Unclassified report

DESCRIPTORS: (*Cylindrical bodies, *Rotating structures, Rotation, *Stresses, *Elasticity, Plasticity.) (Stresses, Mathematical analysis.)

Most plasticity problems are analyzed only after some simplifying assumptions are made. First, the deformations are assumed to be small enough to make infinitesimal strain theory applicable. Second, various simplifications are made regarding the constitutive equations of the material. The usual assumptions are to neglect either or both of elastic strains and plastic strain-hardening. If elastic strains are considered, the resulting equations are usually simplified by assuming elastic incompressibility. The effects of these various assumptions on a simple problem of practical interest are examined. The behavior of a rotating cylinder with a slowly increasing angular speed which takes it successively through fully elastic, elastic/plastic, and fully plastic states is considered. Geometry changes due to deformation, strain hardening, elastic strains, and elastic compressibility are each assessed for their effects on both the speeds and deformations at various stages. (Author)

AD-272 550 Div. 25
(TISTP/WH) OTS price $1.60

Illinois Inst. of Tech., Chicago.
YIELD POINT LOADS OF SPHERICAL CAPS WITH CUTOUTS,
by Philip G. Hodge, Jr. and C. Lakshmikantham.
Dec 61, 16p. incl. illus. table, 5 refs. (DOMIIT rept. no. 1-14)
(Contract Nonr-140604)
Unclassified report

DESCRIPTORS: (*Load distribution, Loading of *Structural shells, Plastics, Stresses, *Plastic flow.) (Stresses, Mathematical analysis.)

A spherical cap with a concentric cut-out is subjected to an external pressure. The yield point value of the pressure is determined for a cap made of rigid perfectly plastic material satisfying the two-moment limited interaction yield criterion. An exact solution is obtained when the outer edge of the cap is free to rotate but restrained against translation. (Author)

AD-272 551 Div. 25
(TISTP/WH) OTS price $2.60

Illinois Inst. of Tech., Chicago.
LIMIT ANALYSIS OF SHALLOW SHELLS OF REVOLUTION,
by Philip G. Hodge, Jr. and C. Lakshmikantham.
Feb 62, 17p. illus. 6 refs. (DOMIIT rept. no. 1-16)
(Contract Nonr-140604)
Unclassified report

DESCRIPTORS: (*Load distribution and Loading of *Structural shells, Elasticity, Stresses, *Conical bodies, Bodies of revolution, Plastics.) (Stresses, Mathematical analysis.)

The theorems of limit analysis are applicable to an approximate theory if and only if the approximate equilibrium and strain-rate velocity relations are such that the principle of virtual work holds between them. A theory for which this is true may be called consistent. Such a consistent theory is developed for shallow shells of revolution and the methods of limit analysis are applied to particular cases of shallow parabolic and conical shells under normal and axial loads. Bounds are obtained on the plastic interaction curves using the two moment limited interaction yield curve. (Author)

AD-272 554 Div. 25
(TISTP/JW) OTS price $13.50

Aeronutronic, Newport Beach, Calif.
THE INFRARED ABSORPTION OF WATER VAPOR.
Final rept. vol. 1 on Theoretical Study of the Infrared Radiative Behavior of Flames,
by P. J. Wyatt, V. R. Stull, and G. N. Plass.
30 Dec 61, 192p. incl. tables, 11 refs. (Publication no. U-1504)
(Contract AF 19(604)7479, Proj. no. 5043)
(AFCRL-62-210, vol. 1) Unclassified report

DESCRIPTORS: (*Infrared radiation, Absorption, *Water vapor.) (Infrared radiation, Atmosphere, Transmission.) Tables.

The infrared absorption of water vapor was calculated over a wide range of path length, pressure, and temperature from 1/1000 cm to 1/10,000 cm. The results are presented in extensive tables which give the transmission over intervals of 1/5 cm at wave numbers below 1/3400 cm. The transmission over intervals of 20, 50, and 1/100 cm is given over the complete frequency range. The calculated data representing the intensity, position, and number of spectral lines in a given frequency interval is tabulated in a form which is useful for transmission calculations. All lines from all isotopic species having an intensity greater than 10 to the -8th power of the strongest line in an absorption region were included in the calculation. The quasi-random model for the representation of band spectra is discussed in detail. Among its features are the possibility of representing the absorption by a series of lines which are arranged neither at random nor in a regular way. (Author)

AD-272 556 Div. 25
(TISTP/MFA) OTS price $2.60

Williamson Development Co., Inc., West Concord, Mass.
VERY LOW PRESSURE GAS BREAKDOWN USING SECONDARY ELECTRONS,
by M. A. Levine and A. G. Rubin. Aug 61, 19p. incl. illus. 9 refs. (Scientific rept. no. 1)
(Contract AF 19(604)4091, Proj. 8608)
(AFCRL 62-239) Unclassified report

DESCRIPTORS: (*Plasma oscillations, Gas ionization, *Gas discharges, Helium, Hydrogen.) (Betatrons, Particles, Orbital flight paths, Electrons, *Electron beams, *Secondary emission.) *Low pressure research.

Breakdown has been produced in hydrogen and helium at pressures down to 10 to the -6th power mm Hg in a toroidal chamber placed in a uniform RF field and in a betatron focussing field. An explanation of the breakdown characteristics is

attempted which relies on secondary electron emission from the walls to produce the initial rapid rise in electron density. An electrostatic wall field and an effective radial potential well due to the RF field are invoked to explain long containment times. (Author)

AD-272 557 Div. 25
(TISTP/MFA) OTS price $3.60

Williamson Development Co., Inc., West Concord, Mass.
PLASMA BETATRON PROBLEMS,
by M. A. Levine and A. G. Rubin. 31 Jan 62, 26p. incl. illus. 5 refs. (Scientific rept. no. 2)
(Contract AF 19(604)4091, Proj. 8608)
(AFCRL 62-249) Unclassified report

DESCRIPTORS: (*Plasma physics, *Betatrons, Electron beams, Particle accelerators, Gas flow, Gas ionization, Magnetic fields.) (Instrumentation, Design, Oscilloscopes, Coils, Transformers, Triodes.)

Methods of design of pulsed air core betatron coils are presented. The properties of several magnetic field configurations and their application to betatrons are discussed. The adopted design is described in detail. The method used to make measurements of the betatron field is described. The design and operation of a pulsed R. F. amplifier for producing plasma for betatron injection is discussed. A shorted coil system for measuring the gas current in a plasma betatron is described. The construction and properties of a double-shielded oscilloscope enclosure is also described. (Author)

AD-272 558 Div. 25
(TISTP/MFA) OTS price $2.60

Williamson Development Co., Inc., West Concord, Mass.
STUDIES AND INSTRUMENTATION RELATING TO HIGH ENERGY DENSITY PLASMA EXPERIMENTS.
Final rept.,
by Alan S. Anderson, Allen G. Rubin and Ivan A. Nichols. 28 Feb 62, 19p. incl. illus. 7 refs.
(Contract AF 19(604)4091, Proj. 8608)
(AFCRL 62-250) Unclassified report

DESCRIPTORS: (*Plasma physics, Feasibility studies and Instrumentation, *Betatrons.) (Energy, Density, Experimental data.) (Vacuum systems, *Particle accelerators, Capacitors.)

Part I is the abstract of Scientific Report No. 1, Very Low Gas Pressure Breakdown Using Secondary Electrons, describing results and instrumentation of experiments on very low pressure gas breakdown. Part II is an abstract of Scientific Report No. 2, Plasma Betatron Problems describing the development of measurement techniques for the investigation of the high energy density induction plasma accelerator referred to as the plasma betatron. Part III discusses further developments in the plasma betatron and low gas pressure breakdown, supporting equipment, and measurement instrumentation for the study of transient phenomena connected with magnetically driven plasmas and exploding wires. It includes particle accelerator studies, water capacitor energy storage studies, and instrumentation. (Author)

AD-272 574 Div. 25, 15
(TISTP/MFA) OTS price $1.60

Institute for Molecular Physics, U. of Maryland, College Park.
MODIFICATION OF THE RYDBERG - KLEIN - REES METHOD FOR OBTAINING POTENTIAL CURVES FOR DOUBLET STATES INTERMEDIATE BETWEEN HUND'S CASES (a) AND (b),
by Joseph T. Vanderslice. 25 Feb 62, 15p. incl. tables, 12 refs. (Technical rept. no. 5)
(Contract Nonr-59514)
Unclassified report

DESCRIPTORS: (*Quantum mechanics, Energy by *Molecular spectroscopy and Vibration, Measurement.) (Mathematical analysis, *Perturbation theory, Operators (Mathematics).)

The Rydberg - Klein - Rees method for obtaining Potential Energy Curves from band-spectroscopic data has been modified to handle doublet electronic states intermediate between Hund's cases (a) and (b). In the derivation, the spin-axis coupling constant has been taken to be independent of distance. The modified equations were used to recalculate the curves for the x squared pi state of NO. (Author)

AD-272 578 Div. 25
(TISTP/JW) OTS price $3.60

Naval Ordnance Lab., White Oak, Md.
UNDERWATER SHOCK WAVE FREQUENCY SPECTRUM ANALYSIS. I. SIMPLE WAVEFORMS APPROXIMATING MEASURED PRESSURE PULSES IN WATER,
by John P. Slifko. Dec 61, 29p. incl. illus. table, 12 refs. (Rept. no. NOLTR 61-94)
Unclassified report

DESCRIPTORS: (Underwater, *Shock waves, Wave analysis, Harmonic analysis, *Fourier analysis.)

A Fourier integral analysis is presented for simple waveforms approximating the more common underwater shockwave pulses; the waveforms treated are the exponential, exponential modified by the recorder frequency characteristics, exponential modified by reflection and cutoff, triangular, and square. A cosine pulse, such as is emitted by sonar transducers, is also shown for comparison. Analytical expressions for the amplitude spectra are summarized and the frequency composition is shown graphically in non-dimensional form for most of the functions. Some of the experimental conditions and recorder characteristics which may produce the various waveforms are noted. The effect upon the frequency composition of the superposition of identical pulses displaced by equal time increments is also discussed. These spectrum analyses, although approximate, permit a better understanding of the relationship between the frequency spectra and the waveforms of underwater shockwaves. (Author)

AD-272 582 Div. 25
(TISTP/MFA) OTS price $2.60

Observatoire de Paris-Meudon (France).
ELECTRON DECAY AND AFTERGLOW IN RARE GASES - HELIUM,
by L. Herman and J. F. Bennoun. 1961, 13p. illus. 12 refs. (Scientific rept. no. 2)
(Contract AF 61(052)17)
(AFCRL-1000) Unclassified report

DESCRIPTORS: (*Glow discharges of Nitrogen, Helium, *Rare gases.) (Electrons, Dissociation, Electron transitions, *Transport properties, *Recombination reactions.) (Instrumentation and Measurement of Electrical conductance.)

The relation between the long duration non-selective afterglow and the electric properties of an excited helium-nitrogen mixture is presented. The decay current was measured during about 6 minutes using a probe technique. Instead of a continuous electrical current, unexplained discontinuous electric pulses are collected by the picoammeter. Although there is a constant decrease with time of the electric current, as for the afterglow light intensity, so far no clear relation has been found between the electric and the radiation phenomena. (Author)

AD-272 583 Div. 25
(TISTP/MFA) OTS price $2.60

Observatoire de Paris-Meudon (France).
AFTERGLOW OF HIGH VIBRATION FIRST POSITIVE BANDS OF MOLECULAR NITROGEN,
by R. Herman and L. Herman. 1961, 22p. incl. illus. tables, 13 refs. (Scientific rept. no. 3)
(Contract AF 61(052)17)
(AFCRL-1065) Unclassified report

DESCRIPTORS: (*Nitrogen, *Glow discharges, Ions, Electrons.) (*Recombination reactions, Transport properties, Excitation, Infrared radiation, Dissociation, Ultraviolet radiation.) (Distribution theory, Probability, Spectrographic data, Photometers.)

The intensity distribution of the first positive band system of N2 was reinvestigated, using the standard photometry procedure. The emission spectrum was obtained from a special afterglow bulb emitting strong bands of the sequence $v' - v$ equals + 5 with a maximum v' value of 21. The population distribution was calculated from the band intensities as well as the vibrational transition probabilities. Two important features are revealed: (1) At the high pressure used (20 mm Hg) there is a pronounced vibrational perturbation at v' equals 13; (2) A strong maximum appears in the population distribution between v' equal 16 and 18. The afterglow was also measured as a function of time. There seems to be a difference in lifetime between the sequences $v' - v$ equals + 4 and $v' - v$ equals + 5. The violet emission shows quite a different time-dependence. The origin of the emission is discussed: it seems to be related to the atomic recombination process. (Author)

AD-272 586 Div. 25
(TISTP/TL) OTS price $1.60

Syracuse U. Research Inst., N. Y.
AN ANALYSIS OF ATMOSPHERIC REFRACTION,
by A. H. Faulds and R. H. Brock. Mar 60, 14p. incl. illus. (Rept. no. CE 743-603T; Technical note no. 1)
(Contract AF 30(602)2155)
Unclassified report

DESCRIPTORS: (Analysis, *Atmosphere, *Refraction.) (Optics, Light, Density, *Refractive index, Optical images.) (*Aerial photography, *Mapping.)

An optical ray which travels from a point on the surface of the earth to a point in space is continuously refracted as it passes through an atmosphere of continuously decreasing density. Atmospheric refraction thus bends optical rays to curvilinear form and this effect must be considered in aerial photogrammetry when the utmost accuracy is desired. (Author)

AD-272 604 Div. 25
(TISTP/WH) OTS price $6.60

Cornell U., Ithaca, N. Y.
THE PHOTOELECTRIC K-ABSORPTION CROSS SECTION OF HELIUM AND LITHIUM,
by D. J. Baker, Jr. Feb 62, 60p. incl. illus. tables, 24 refs. (Technical rept. no. 7)
(Contract Nonr-40137, Proj. NR017-625)
Unclassified report

DESCRIPTORS: (*Photons, Absorption, *Helium, *Lithium.) (Atoms, Energy, Absorption, *Electron transition.) (Instrumentation, *X-ray absorption analysis, Photomultipliers.)

The absorption cross section of Helium in the spectral region near the K-edge was measured. Results were in good agreement with calculations. The absorption cross section of Lithium near its K-edge was measured with an uncertainty of 10%. Observations agree with the results of a calculation performed using the published calculations on Helium as a guide. The measurement of the absorption cross section differed from that of previous investigators in that a small cell was used to confine the gas, whereas in other investigations the entire optical path of a gas-filled spectrometer served as the absorbing sample. An advantage which accrues from the use of a gas cell is the possibility of carrying out absorption measurements utilizing a soft x-ray emission band as a source and a photomultiplier as a detector. Such a combination provided an accurate attenuation measurement for Helium at 180 A, the short wavelength end of the spectral range of interest. At all longer wavelengths (200 to 600 A), a condensed spark served as the source of radiation which was detected photographically. (Author)

AD-272 605 Div. 25
(TISTW/RD) OTS price $7.60

Columbia Radiation Lab., New York.
RESEARCH INVESTIGATION DIRECTED TOWARD EXTENDING THE USEFUL RANGE OF THE ELECTROMAGNETIC SPECTRUM.
Quarterly progress rept. no. 8, 16 Sep-15 Dec 61, by R. Novick. 15 Dec 61, 72p. incl. illus. refs.
(Contract DA 36-039-sc-78330)
Unclassified report

DESCRIPTORS: (*Microwaves, Microwave frequency, Microwave networks, Microwave spectroscopy.) (Measurement of Hyperfine structure of Lithium, Ions.) (Zinc, Cadmium, Isotopes, Radioactive isotopes.) (Simulation of Planetary atmospheres for Measurement of Electromagnetic properties.) (Measurement, Hydroxides, Free radicals.) Cryogenics, Masers, Solid state physics, Nuclear physics, Molecules, Radio astronomy, *Electromagnetic waves.

A number of projects involving the optical detection of energy level crossings are described, including work on various isotopic species of Zn and Cd. Results are given for the lifetimes of certain of these states. A new experiment

is described for the measurement of the hyperfine structure of Li ions. Several optical double-resonance studies are reported, including work on Na and radioactive Cd. New experimental programs are described in microwave spectroscopy of molecules, the production of cryogenic magnets, and a Rb atomic clock. Final results are given for measurements of the O17H free radical. Microwave and optical maser research is discussed. A new experiment for measuring the microwave properties of simulated planetary atmospheres is in progress. (Author)

AD-272 606 Div. 25
(TISTP/MFA) OTS price $2.60

Hawaii Inst. of Geophysics, Honolulu.
ABSORPTION COEFFICIENTS OF O2 IN THE VACUUM ULTRAVIOLET.
by F. M. Matsunaga and K. Watanabe. Dec 61, 18p. incl. illus. tables, 13 refs. (Contribution no. 33; Scientific rept. no. 5)
(Contract AF 19(604)4576)
Unclassified report

DESCRIPTORS: (*Absorption of *Oxygen in *Ultraviolet radiation, Vacuum systems, Gas ionization.) (Photomultipliers, Photoelectric effect, Monochromatic light, Discharge tubes.) (Experimental data, Tables.)

With a resolution of 0.2 A the absorption coefficients of O2 were obtained for about 600 wavelengths in the region 840-1100 A and also at 584.3 A. This method resolved band structures which were not detected by previous photoelectric measurements and at many wavelengths where comparison could be made the absorption coefficients agreed closely with the earlier data. Also with this improved resolution a pressure effect was observed for the pre-ionized H, H', N and N' bands. Continua due to photodissociation and photoionization were observed in the absorption spectrum. Vibrational levels of the ion were inferred from the absorption spectrum. Several absorption bands seem to form a limit at 1026.5 A, the position of the ionization potential obtained by a photo-ionization method. (Author)

AD-272 607 Div. 25, 20
(TISTP/MFA) OTS price $3.60

Kjeller Research Establishment (Norway).
MAGNETIC DIFFRACTION OF NEUTRONS.
Annual technical rept. no. 1, 1 Jan-31 Dec 61. 31 Dec 61, 15p. illus. (Rept. no. OI-7340-61)
(Contract DA 91-591-EUC-1679)
Unclassified report

DESCRIPTORS: (*Inelastic scattering of *Neutrons in Crystals of Magnetite, Cobalt, Polarization, Electron beams, Diffraction, *Nuclear resonance, Nuclear spins.) (Pulse analyzers, Electromagnets, Mirrors, Magnetometers, Instrumentation, Vacuum furnaces, Neutron crystal spectrometers.)

Some experiments on magnetite have established the existence of the scattering surface in spin wave experiments. The surfaces are the equivalents of constant energy surfaces of spin waves in momentum space. At increasing temperatures the surfaces expanded, corresponding to an increase of the momentum vector of a certain spin wave energy. The surfaces exist even in the Curie temperature region, showing the presence of spin wave-like excitations at these temperatures. An increase in the width of the spectrum of scattered neutrons demonstrates that the magnon life time decreases at increasing temperature. Experiments were started to determine the diameter of the constant energy surfaces of spin excitations in cobalt metal by measuring the angular width of the corresponding neutron scattering surface. Some preliminary curves are given. Other experiments are aimed at studying the spin wave scattering of polarized neutrons. The experiments have so far been concerned with producing a strong beam of polarized neutrons. Up to now a neutron mirror has been used and the polarization obtained is about 60 per cent. (Author)

AD-272 620 Div. 25
(TISTM/EJH) OTS price $1.10

Institute of Optics, U. of Rochester, N. Y.
INVESTIGATIONS OF THE OPTICAL DETECTION OF HYPERFINE RESONANCES IN ALKALI VAPORS.
Quarterly progress rept. no. 2, 15 Aug-15 Nov 61, by C. O. Alley. 15 Nov 61, 4p.
(Contract DA 36-039-sc-87273, Proj. 3A99-15-001)
Unclassified report

DESCRIPTORS: (*Alkali metals, *Rubidium, Hydrogen, Atoms, Vapors, *Hyperfine structures, Nuclear spins, Relaxation time, Atomic energy levels, Detection by Optics.) (Programming, Digital computers.) Optical equipment.

Some digital computer solutions (IBM 650) of the equations of optical pumping for the time development of populations under optical pumping following a 180 degree pulse were obtained. Equilibrium populations as a function of relaxation in the excited state were obtained which show the manner in which ground state populations cross each other and change their relative values. Preliminary numerical calculations were carried out for optical pumping in atomic hydrogen. (Author)

AD-272 624 Div. 25, 8
(TISTM/BRW) OTS price $1.60

Shockley Transistor Corp., Palo Alto, Calif.
FAILURE MECHANISMS IN SILICON SEMICONDUCTORS.
Quarterly status rept. no. 2, 1 Oct-31 Dec 61, by Hans J. Queisser. 31 Dec 61, 13p. 7 refs.
(Contract AF 30(602)2556)
(RADC TDR 62-58) Unclassified report

DESCRIPTORS: (*Failure (Mechanics), *Silicon, *Semiconductors, Diffusion, Gallium, Grains (Metallurgy), Crystal structure, Lattices, Deformation, Chemical impurities, Oxygen, Surfaces, Contamination.) Electrical properties, Photoelectric effect.

Investigations of dislocations, small angle grain boundaries, twin boundaries, and stacking faults in Si were continued with the object of determining the influence of these defects upon reliability and failure of Si semiconductor devices. Enhanced grain boundary diffusion of Ga shows marked deviations from theory. Small angle grain boundaries in Si yield photo-response with the polarity depending upon the thermal history of the sample. This is in contrast to results in Ge. Oxygen impurity atmospheres around the dislocations apparently determine the photoresponse and the conductivity type of the boundaries. Electrical and diffusion properties

at coherent and incoherent twin boundaries may be understood from the crystallographic models of these boundaries. Stacking faults appear to originate preferentially at O contaminated surfaces when used as substrates for epitaxial growth. (Author)

DELETED

AD-272 635 Div. 25, 17
(TISTM/GEC) OTS price $1.60

Strasbourg U. (France).
PREPARATION OF IRON PHOSPHIDES, IRON BORIDES, COBALT BORIDES AND TERNARY ALLOYS OF BORON OR PHOSPHORUS WITH FE, CO, NI, MN AND THE STUDY OF THEIR DIFFERENT MAGNETIC PROPERTIES.
Final technical rept. no. 3, 1 Jan-31 Dec 61. 31 Dec 61, 13p. incl. illus. tables, 9 refs.
(Contract DA 91-511-EUC-1656)
Unclassified report

DESCRIPTORS: (*Iron compounds, *Cobalt compounds, Borides, *Phosphides, Synthesis.) (Alloys, *Boron alloys, Transition elements, Iron alloys, Cobalt alloys, Nickel alloys, Manganese alloys, *Phosphorus alloys.) (Ferromagnetism, *Ferromagnetic materials, Ferroelectric crystals, Paramagnetic crystals, Magnetic properties, Antiferromagnetism, Thermodynamics.) France.

The study of iron phosphides was completed. Co2P and some ternary phosphides of Fe-Co-P were prepared. The ternary alloys, (Me1, Me2)2B type and (Me1, Me2)B type, Me1 and Me2 being transition metals were studied. The FeP phosphide was ferromagnetic with a Curie point at 215 K. FeP2 was paramagnetic with negative Curie points. (Fe, Co)2B and (Fe, Ni)2B alloys and some among the (Co, Ni)2B and (Fe, Mn)2B alloys were studied. Curie points and magnetic moments were determined. Curie points of Fe2(1-x) Ni2xB decreased rapidly with increasing Ni content. Ferromagnetism of Co2(1-x) Ni 2xB and Fe2(1-x)Mn2xB disappears for values of x, above 50%. (Author)

AD-272 637 Div. 25, 4
(TISTM/EJH) OTS price $3.60

Clarendon Lab., U. of Oxford (Gt. Brit.).
NUCLEAR RESONANCE IN LIQUID AND SOLID HE3 AT LOW TEMPERATURES.
Final technical status rept., 1 Nov 60-31 Oct 61, by J. Hatton and D. F. Brewer. 31 Oct 61, 18p. illus. 5 refs.
(Contract DA 91-591-EUC-1643)
Unclassified report

DESCRIPTORS: (*Helium, Isotopes, Solids, Liquids, Magnetic properties, *Nuclear magnetic resonance, Nuclear spin, Relaxation time, Cryogenics, High pressure research, Laboratory equipment, Radiofrequency, Measurement.)

The cryogenic requirements for the preliminary investigation were comparatively simple and consisted of a chamber containing liquid He-4 which can be cooled to 1K and in which the He-3 cavity is situated. Pressures can be raised to over 150 atm by means of a thermal compression unit. Several different electronic systems were investigated for making nuclear resonance measurements. Measurements of the spin-lattice relaxation time gave values around 1 minute; the true relaxation is known to be closer to 5 min. The short times observed are probably due to impurity or wall relaxation.

DELETED

AD-272 644 Div. 25, 2, 22
(TISTP/GRW) OTS price $2.60

Army Signal Missile Support Agency, White Sands Missile Range, N. Mex.
SOUND PROPAGATION THROUGH A WINDY ATMOSPHERE.

Progress rept. no. 2,
by Henry Rachele. Feb 62, 20p. incl. illus. tables.
Unclassified report

DESCRIPTORS: (Mathematical analysis of *Sound transmission in Atmosphere.) (Sound, Propagation, Snell's law, Rockets, Exterior ballistics, *Wind.)

The derivation of two models which can be used for two-dimensional ray tracing of sound through a windy atmosphere is discussed. A calculation procedure outline and sample calculations are also presented. (Author)

AD-272 648 Div. 25
(TISTP/WH) OTS price $4.60

Brown U. Div. of Applied Mathematics, Providence, R. I.
IMPACT OF A CANTILEVER BEAM WITH STRAIN RATE SENSITIVITY,
by Thomas C. T. Ting and P. S. Symonds. Jan 62, 40p. incl. illus. tables, 7 refs. (Technical rept. no. 73; Rept. no. C11-73)
(Contract Nonr-56210, Proj. NR 064-406)
Unclassified report

DESCRIPTORS: (*Cantilever beams, Loading, Load distribution, *Deformation, *Plasticity.) (Stresses, Mathematical analysis.)

A theoretical investigation is presented of the plastic deformation of a cantilever beam with an attached tip mass, subjected to a rapid transverse velocity change at the base. The strain rate dependence of the yield stress, and the geometry changes, are considered. Results are compared with those of experiment, and show good agreement. (Author)

AD-272 649 Div. 25
(TISTP/MFA) OTS price $2.60

Brown U. Div. of Applied Mathematics, Providence, R. I.
A SPHERICAL SHELL UNDER POINT LOADS AT ITS POLES,
by W. T. Koiter. Feb 62, 20p. 8 refs. (Technical rept. no. 75; rept. no. C11-75)
(Contract Nonr-56210, Proj. NR-064-406)
Unclassified report

DESCRIPTORS: (*Stresses on *Structural shells under Loading and *Load distribution, Mechanics, Shear stresses.) (Tensor analysis, Functions, Partial differential equations, Polynomials, Linear systems.)

A rigorous solution in closed form is obtained of the equations of the linear theory of shells for the case of a spherical shell under point loads at its poles. The solution reduces to a membrane state of stress at some distance from the poles. In the immediate vicinity of the poles, E. Reissner's results for a shallow spherical shell under a point load at its apex (Journ. of Math. and Phys. 25:80-85, 279-300, 1947) are confirmed; the discrepancies remain within the limits of accuracy of shell theory. (Author)

AD-272 657 Div. 25
(TISTP/MFA) OTS price $3.60

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
MAGNETOHYDRODYNAMICS AND ENERGY CONVERSION.
Technical progress rept. no. 5 for period ending 30 Nov 61.
15 Dec 61, 30p. incl. illus. tables, 3 refs.
(Contract AF 33(616)7624; In cooperation with National Science Foundation, Grant G-9330)
Unclassified report

Included as section of Quarterly progress rept. no. 64, 15 Jan 62.

DESCRIPTORS: (*Magnetohydrodynamics, Plasma physics, Fluid flow, Continuum mechanics, Thermal conductivity, *Energy.) (*Shock waves, Wave transmission, *Thermionic emission, *Fuel cells, Parametric amplifiers.)

AD-272 664 Div. 25
(TISTP/TL) OTS price $1.10

Rock Island Arsenal Lab., Ill.
DEFLECTION OF BEAMS INCLUDING SHEAR DEFLECTION,
by Catherine M. Fitzpatrick. Jan 62, 7p. incl. illus. 2 refs. (Rept. no. 62-336)
(Proj. 517-01-002)
Unclassified report

DESCRIPTORS: (*Beams, *Deflection, *Load distribution, Shear stresses.) (Stresses, Mathematical analysis.)

The purpose of this analysis was to derive a set of beam deflection formulas for use when shear deflection is a significant amount of the total deflection. Fourteen load and support conditions were considered. Formulas for the deflection at any point along the beam as well as formulas for the deflection at the critical points are presented in chart form. (Author)

AD-272 685 Div. 25, 15
(TISTP/MFA) OTS price $1.10

Brown U. Div. of Applied Mathematics, Providence, R. I.
A NOTE ON THE PRINCIPLE OF MINIMUM POTENTIAL ENERGY FOR LINEAR ANISOTROPIC ELASTIC SOLIDS,
by M. E. Gurtin. Feb 62, 7p. 8 refs. (Technical rept. no. 15)
(Contract Nonr-56225, Proj. NR-064-431)
Unclassified report

DESCRIPTORS: (Solid state physics, Statics and *Elasticity in *Solids, Shear stresses.) (Energy, *Potential theory, Tensor analysis, *Partial differential equations, Linear systems.)

AD-272 691 Div. 25, 14, 30
(TISTM/BRW) OTS price $2.00

American Machine and Foundry Co., Alexandria, Va.
ELECTRON BEAM TECHNIQUE FOR MEASURING THE THERMOPHYSICAL PROPERTIES OF MATERIALS.
Rept. for 1 May 59-31 Mar 60 on Materials Analysis and Evaluation Techniques,
by H. M. Childers and J. M. Cerceo. Nov 61, 66p. incl. illus. tables, 5 refs.
(Contract AF 33(616)6527, Proj. 7360)
(WADD TR 60-190) Unclassified report

DESCRIPTORS: (*Materials, Thermal conductivity, Thermal diffusion, Specific heat, *Heat transfer, Blackbody radiation, Thermodynamics.) (High temperature research, Test equipment, Cylindrical bodies, Heating, *Electron beams, Electron bombardment, Vacuum apparatus, Instrumentation.) (Statistical analysis, Differential equations, Theory.) (Graphite, Aluminum compounds, Oxides, Measurement, Physical properties, Surfaces, Data.)

The suitability of electron bombardment for measuring the thermophysical properties of materials was established. A solution applicable to the case of a radiating cylindrical sample is presented; the technique offers a valuable tool for measuring these properties within described limits. Values of thermal diffusivity, thermal conductivity, density/specific heat, and total normal emissivity were determined for graphite and Al2O3 (polycrystalline). Recommendations on instrumentation are made for the further development of this technique. (Author)

AD-272 751 Div. 25
(TISTP/MFA) OTS price $2.60

Columbia U., New York.
DIFFRACTION OF PULSES BY ARBITRARY TWO DIMENSIONAL FREE SURFACES,
by Richard P. Shaw and Morton B. Friedman.
Dec 61, 20p. incl. illus. 3 refs. (Technical rept. no. 29; CU-3-61 ONR-266(08)-CE)
(Contract Nonr-26608)
Unclassified report

DESCRIPTORS: (*Diffraction of *Acoustics, *Shockwaves around Wedges.) (Wave transmission, Velocity.) (Integral equations, Potential theory.)

The analysis of obstacles composed of free surfaces (surfaces of constant potential and pressure) corresponding to Dirichlet conditions are studied. The field variable of interest is the spatial derivative of the potential, i.e. the velocity. As in the rigid problem the effect of the discontinuity in the velocity at the wave front can be separated from the remaining surface effects and integrated directly. The remaining integrals are again approximated by assuming the surface velocity to have an averaged value over specified intervals in space and time. The integrations may then be replaced by summations which, because of the time-retarded effect, lead to successive non-simultaneous algebraic equations for the unknown surface velocities. The free surface configuration for which results are obtained is that formed by a box-shaped obstacle composed of free surfaces which is bisected by an infinite plane free surface; the asymptotic velocity, field in the media is independent of time. The solution can be obtained from the case of the infinite media by the image principle, i.e. by an appropriate superposition of compression and expansion pulses of equal magnitude. (Author)

AD-272 771 Div. 25
(TISTP/WH) OTS price $3.60

Pomona Coll., Claremont, Calif.
MICROANALYSIS WITH ULTRASOFT X-RADIATIONS,
by Burton L. Henke. Jan 62, 37p. incl. illus. 11 refs. (Technical rept. no. 6)
(Contract AF 49(638)394)
(AFOSR-1995) Unclassified report

DESCRIPTORS: (*X-ray spectroscopy, X rays, Reflection, Absorption, Diffraction, Fluorescence, *Secondary emission.) (X-ray spectroscopy, Crystals, Cells (Biology).) (Crystals, *Microstructure, Metallic crystals, Electron diffraction analysis.)

The diffraction, reflection, absorption, fluorescence and the electronic emission which results from the interaction with ultrasoft x-rays are presented as practical bases for microanalysis. Recent developments on sources and detectors for the ultrasoft x-radiations are described. A preliminary report of a current investigation on low energy photo-Auger electron analysis and on a new type of low energy electron spectrometer is also presented. (Author)

AD-272 773 Div. 25
(TISTP/WH) OTS price $5.60

Physics, Engineering, Chemistry Corp., Boulder, Colo.
QUANTUM MECHANICAL STUDY OF THE VISCOSITY OF GASES.
Final technical rept. on Mathematical Techniques of Aeromechanics,
by Neil Ashby. Dec 61, 54p. 11 refs.
(Contract AF 33(616)7602, Proj. 7071)
(ARL-102) Unclassified report

DESCRIPTORS: (*Quantum mechanics, *Gases, *Transport properties, Viscosity, Shear stresses.) Tensor analysis.

A general uniform deformation of a portion of gas or fluid is described quantum mechanically and an appropriate effective Hamiltonian is derived. This Hamiltonian is then used to derive operator expressions for the stress tensor, and for the coefficients of shear and bulk viscosity. The resulting expressions for the viscosity coefficients are formally exact and hold for all homogeneous systems. The formula for the shear viscosity is evaluated in a very simple approximation and the results are shown to correspond closely to those derived on the basis of the kinetic theory of gases. A better approximation, which should be good for long-range forces, is suggested and investigated briefly. (Author)

AD-272 783 Div. 25
(TISTP/WH) OTS price $3.60

Westinghouse Electric Corp., Pittsburgh, Pa.
CROSS SECTIONS AND ELECTRON AFFINITY FOR O(-) IONS FROM O2, CO, CO2 BY ELECTRON IMPACT,
by C. J. Schulz. 26 Dec 61, 17p. illus. tables, 36 refs. (Technical rept. no. 8; Scientific paper no. 908-3901-P5)
(Contract Nonr-258400)
Unclassified report

DESCRIPTORS: (*Oxygen, *Ions, Electrons, Carbon dioxide, Carbon compounds, Monoxides, *Dissociation, Probability.)

Cross sections for the formation of O(-) from O2, CO, and CO2 were measured using an electron beam experiment in which an attempt is made to eliminate kinetic energy and angular discrimination by collecting most of the positive and negative ions produced in the tube. The cross sections are independent of electron current, pressure, and magnetic field. The values of these cross sections at their peak are 1.3 x 1/10 to the 18th power sq cm at 6.7 ev in O2, 1.6 x 1/10 to the 19th power sq cm at 10.1 ev in CO, and 4.5 x 1/10 to the 19th power sq cm at 8.2 ev in CO2. O(-) from CO2 exhibits a second smaller

peak at 4.2 ev with a cross section of 1.5 x 1/10 to the 19th power sq cm. Kinetic energy measurements on the O(-) ion from O2 and CO2 are not compatible with the value for the electron affinity (1.465 ev) obtained from photodetachment experiments but yield an electron affinity of 2.0 ± 0.1 ev and so suggest the existence of excited states of O(-). (Author)

AD-272 786 Div. 25, 4, 14
(TISTM/GEC) OTS price $10.50

Westinghouse Electric Corp., Bloomfield, N. J.
IMPROVED RED ELECTROLUMINESCENT PHOSPHORS.
Rept. for June 60-May 61 on the Chemistry and Physics of Materials,
by H. F. Ivey. Dec 61, 128p. incl. illus. tables, 80 refs.
(Contract AF 33(616)7350, Proj. 7360)
(ASD TR 61-167) Unclassified report

DESCRIPTORS: (Luminescence, *Luminescent materials, Luminescent pigments, *Phosphors, *Crystal phosphors, Colors.) (*Complex compounds, *Zinc compounds, *Sulfides and Copper compounds, Thallium compounds, Lithium compounds, Iron compounds, Iodides, Cadmium compounds, Aluminum compounds, Mercury compounds, Oxygen compounds.) (Photoemission, Excitation.) (Dielectrics, Plastics, Impregnation, Phosphors.)

A large number of elements were tried for their possible effect as activators of red emission in ZnS. Considerable effort was given to the ZnS:Cu,Tl, ZnS:Cu,Li,Ti, and ZnS:Cu,Fe,I systems, all of which showed some potential as red emitters. A development possibly leading to an improved red electroluminescent phosphor was that of treatment of hexagonal (Zn,Cd)S:Cu,I phosphors in I vapor. The best phosphors of the desired color made in this way had a quantum efficiency about 25% of that of conventional green-emitting cubic ZnS:Cu,Cl phosphors and a brightness about one-third that of a cubic (Zn,Cd,Hg)S:Cu, In phosphor. The best red-emitting electroluminescent phosphor known therefore was still (Zn,Cd,Hg)S:Cu. As a result of improvements in plastic dielectrics for embedding the phosphor and in voltage breakdown protection by use of layers containing BaTiO3, considerably higher brightness was obtained. (Author)

AD-272 790 Div. 25, 2
(TISTP/WH) OTS price $1.10

Enrico Fermi Inst. for Nuclear Studies, U. of Chicago, Ill.
(No title).
Final rept.,
by Peter Meyer. Feb 62, 3p.
(Grant Nonr-(G)-00010-60)
Unclassified report

DESCRIPTORS: (Balloons, Solar observatories.) (*Cosmic rays, *Protons, *Solar disturbances.)

Three high altitude balloon flights were conducted from Fort Churchill, Manitoba, to investigate the energy spectrum of primary cosmic ray protons in the region from 70 to 400 Mev. This energy interval, for which little detailed data exist, is of particular interest in connection with the proposed mechanisms to account for the modulation of galactic cosmic ray particles by solar phenomena. Also, in this region of energy, frequent emission of solar particles occurs and the determination of their energy distribution and the change of their intensity with time, following a solar outburst, yields valuable information of (1) the solar acceleration mechanism, and (2) the electromagnetic conditions in interplanetary space during the solar event. (Author)

AD-272 794 Div. 25
(TISTP/MFA) OTS price $4.60

Geophysics Corp. of America, Boston, Mass.
PLASMA REACTION STUDIES II.
Final technical rept. on Items II, III, IV and V,
by H. Ingrao and P. J. Nawrocki. Feb 62, 42p. incl. illus. tables (GCA technical rept. no. 62-7-A)
(Contract AF 19(604)7405)
(AFCRL-62-60) Unclassified report

DESCRIPTORS: (*Solar spectrum, Analysis by Optical equipment, Photometers, Photomultipliers, Measurement, Photons.) (Tables, Astronomical data.) Plasma physics, *Solar noise and *Extraterrestrial radio waves in *Upper atmosphere.

AD-272 804 Div. 25
(TISTM/GEC) OTS price $4.60

David Sarnoff Research Center, Princeton, N. J.
HEXAGONAL MAGNETIC COMPOUNDS.
Quarterly rept. no. 2, 15 Sep-14 Dec 61,
by Robert L. Harvey, Irwin Gordon, and R. A. Braden. 14 Dec 61, 47p. incl. illus. tables, 2 refs.
(Contract DA 36-039-sc-87433)
Unclassified report

DESCRIPTORS: (*Ferromagnetic materials, Synthesis, *Metallic crystals, *Crystal structure, Magnetic properties, *Phase studies, Cylindrical bodies, Magnetic moments, X-ray diffraction analysis, Microwave spectroscopy, Measurement.) (Nickel compounds, Copper compounds, Zinc compounds, Barium compounds, Lead compounds, Iron compounds, Oxides.) (Particles, Sintering, Temperature.)

Samples of the composition Ni.3 Cu.7 Zn1.0 Ba2-x Pbx Fe12 022 where x equals 0.1, 0.3, 0.5, and 0.7 were prepared. With increasing value of x and/or firing temperature the result appeared to be a material having a positive anisotropy sign and a higher-than-normal value of saturation magnetization. Chemical and x-ray analyses are being employed to learn the composition of this final phase. New compounds of the W type were prepared as spheres and toroids. The static characteristics of these compounds indicated that they had the general behavior of the Z type compounds; that is, the sign of anisotropy changes with composition. A simple instrument was devised and built for the measurement of intensity of magnetization versus temperature. The Y type compounds had good thermal coefficient of intensity of magnetization while the Z compounds did not. These results were in agreement with those found for the change of permeability versus temperature. The oriented cylinders of the composition (Ni.3 Cu.7 Zn1.0)Y designed to study the processing parameters on the static and microwave properties, were made. (Author)

Division 25 - PHYSICS

AD-272 808 Div. 25
(TISTP/MFA) OTS price $2.60

University of Southern Calif., Engineering Center, Los Angeles.
RESEARCH IN PLASMA AND MAGNETOHYDRODYNAMICS.
Interim technical rept., (Final),
by Zohrab Kaprielian. Dec 61, 19p. 6 refs.
(USCEC rept. no. 79-101)
(Contract AF 49(638)522, Proj. 9768)
(AFOSR-1998) Unclassified report

DESCRIPTORS: (*Plasma physics, *Magnetohydrodynamics, Electromagnetic waves, Scattering.) (*Feasibility studies, *Parametric amplifiers, Cesium, Microwaves, Plasma oscillations, Conductivity.) (Perturbation theory, Polynomials.)

Theoretical and experimental work in four major areas are presented: (1) Electromagnetic Wave Propagation in Ionized Media; (2) Plasma Diagnostics; (3) Electromagnetic Scattering Properties of a Plasma; and (4) Amplification of Plasma Waves. The results of these investigations were discussed in publications and technical reports and are reviewed briefly. (Author)

AD-272 814 Div. 25
(TISTP/MFA) OTS price $2.60

Advanced Kinetics, Inc., Costa Mesa, Calif.
ACCELERATION AND COMPRESSION OF PLASMA IN STRONG-GRADIENT, HIGH-FIELD GEOMETRIES.
Rept. on Study of Conditions in High Temperature Non-equilibrium Plasma Configurations,
by R. W. Waniek and H. Fischer. 15 Sep 61, 16p. illus. (Scientific rept. no. 5)
(Contract AF 19(604)7363, Proj. 5634)
(AFCRL 62-84) Unclassified report

DESCRIPTORS: (*Plasma physics, *High temperature research, Stability.) (Gas ionization and *Transport properties of Hydrogen under *Magnetic pinch.) (Electromagnetic waves, Thermal radiation, Magnetic fields, Dipole moments.) (Instrumentation, Vacuum systems, Photomultipliers, High speed photography.)

Problems of interaction and thermalization of colliding plasmas characterized by large axial velocities and generated with strong induced magnetic dipole moments were studied. Experiments were conducted in two configurations in which the plasma was generated, compressed, and accelerated by the same magnetic field. The geometry consists basically of two asymmetric collapse accelerators compounded electrically. Two possible configurations exist: (1) the currents in both halves circulate in the same sense which is called Helmholtz geometry; and (2) the currents in the two parts will have opposite directions and are termed a counter Helmholtz geometry. The gas, usually hydrogen, is contained in a biconical quartz container. The geometries are connected to low-inductance capacitor banks and special vacuum switches are used for current transfer. A plasma sheath is thus generated at a precise radial within each of the two halves of the geometry. The plasma appears to have slightly elongated shapes. In the interior both ions and electrons will be mainly non-adiabatic and are bounded by interval collision with the sheath.

AD-272 816 Div. 25
(TISTP/MFA) OTS price $2.60

General Dynamics/Astronautics, San Diego, Calif.
INFRARED EMISSIVITY OF CARBON DIOXIDE,
by W. Malkmus. Feb 62, 28p. incl. illus.
15 refs. (Rept. no. AE62-0204)
(Contract AF 19(604)5554)
Unclassified report

DESCRIPTORS: (*Infrared radiation in *Carbon dioxide, *Infrared spectroscopy, Flames.) (Temperature, Pressure, Optics.) (Harmonic oscillators, Vibration.) (Functions, Potential theory.)

Simplified equations are developed for computing the emissivity of the carbon dioxide 4.3 micron band. The harmonic oscillator model is assumed in computing line intensities, but anharmonicity is considered in computing the frequencies of emitted radiation. Calculated values are presented for temperatures ranging from 300 to 3000 K, from which emissivities may be readily computed for a given pressure and optical path in both the weak line and strong line approximations. Comparisons are made with published experimental data using the weak line approximation, and in several cases, the strong line approximation. A mixed strong line-weak line approximation is also shown. The results are shown to be in reasonable agreement with published experimental data and in definite disagreement with other theoretical calculations. (Author)

AD-272 821 Div. 25
(TISTP/MFA) OTS price $2.60

Maryland U., College Park.
STUDY OF SHOCK PROPAGATION IN A RAREFIELD PLASMA, INTERACTION OF SHOCK WAVES WITH MAGNETIC FIELDS AND BASIC LAWS OF MAGNETO-GAS-DYNAMICS.
Final rept.,
by H. R. Griem. Dec 61, 26p. incl. illus. table, 4 refs.
(Contract AF 19(604)4074, Projs. 7674 and 7670)
(AFCRL-62-240) Unclassified report

DESCRIPTORS: (Plasma physics, *Shock waves, Wave transmission, *Shock tubes, Design, *Gas discharges, Electromagnetic waves, Magnetic fields.) (Vacuum systems, Ultraviolet radiation, Ultraviolet spectroscopy, Instrumentation.) (Measurement of Temperature and Density in Hydrogen and Helium.)

Mach 20-70 shock waves are produced by rapid ohmic heating from fast capacitor discharges between electrodes inserted into two opposing ends of a T-shaped tube or from electrodeless discharges in a cylindrical tube surrounded by a single turn coil of a magnetic compression apparatus. With T-tubes, the shock waves propagate into about 1 mm Hg of hydrogen or helium that is pre-excited and ionized by the ultraviolet radiation from the discharge. With magnetic compression, about 0.1 mm Hg of hydrogen is preionized by an auxiliary discharge through the same coil, and a slowly varying magnetic bias field is established by another capacitor discharge. Spectroscopic determinations of the equilibrium conditions behind the shock fronts in T-tubes were made and are in progress for the cylindrically imploding shock waves in the magnetic compression experiment. Some insight into the structure of the shock fronts was gained from the rise-times of spectral line intensities. The shock-heated plasma in the T-tubes is apparently in local thermal equilibrium and could therefore be used as a thermal light source for the determination of Stark broadening parameters of hydrogen and helium lines. (Author)

AD-272 835 Div. 25, 17
(TISTM/GEC) OTS price $1.60

Cincinnati U., Ohio.
THERMODYNAMIC INVESTIGATION OF CERAMIC MATERIALS AT ELEVATED TEMPERATURES.
Quarterly rept., 15 Sep-15 Dec 61,
by Michael Hoch. 16 Feb 62, 10p. incl. illus. tables, 4 refs.
(Contract AF 33(616)6299, Proj. 7021)
Unclassified report

DESCRIPTORS: (*Ceramic materials, *Refractory materials, *Thermodynamics, High temperature research, Crystals, Lattices.) (Electrolytic cells, Iron compounds, Oxides, Electric potential.) (*Chromium compounds and *Zirconium compounds, *Oxides.) (Chromium alloys, Nickel alloys.) (Theory, *Phase studies, X-ray diffraction analysis, Metallurgical analysis.)

The EMF measurements on the cell Fe,FeO/electrolyte (0.8 ZrO2 0.2 CaO/FeO,Fe3O4 and the evaluation of the vacancy interaction energy in FeO are given. Several compositions in the Cr-Ni binary were investigated and the results are reported. The Zr-Cr-O ternary system was investigated by room temperature X-ray diffraction patterns and metallographic techniques. Studies were also made from 1200 to 1500 C. (Author)

AD-272 836 Div. 25, 27, 20
(TISTP/MFA) OTS price $5.60

AVCO Research Lab., Everett, Mass.
THE APPLICATION OF MAGNETOHYDRODYNAMIC GENERATORS IN NUCLEAR ROCKET PROPULSION,
by R. J. Rosa. Aug 61, 48p. incl. illus. table, 26 refs. (Research rept. no. 111)
(Contract AF 04(647)278)
Unclassified report

DESCRIPTORS: (*Magnetohydrodynamics, Generators in *Nuclear propulsion.) (Rocket propulsion, *Rocket propellants, *Nuclear power plants, Design.) (Thermodynamics, Heat transfer, Entropy, Heat exchangers, Thrust augmentor nozzles.)

A propulsion scheme using a magnetohydrodynamic (MHD) generator and gas core nuclear reactor was previously described which avoids the necessity for retaining fissionable material within the reactor itself. Other possible schemes including, in particular, closed power cycles that use the propellant as their heat sink are considered. The use of the air stream for thrust augmentation is presented. With electric power as the fuel an air breathing engine can, in principle, have high efficiency over a wide velocity range. Such a powerplant, in addition to avoiding the problem of retaining fissionable material, would have a great advantage in specific impulse and load carrying ability over a gas core reactor used alone. (Author)

AD-272 837 Div. 25
(TISTP/MFA) OTS price $3.60

AVCO Research Lab., Everett, Mass.
FIELD COILS FOR MHD GENERATORS,
by Z. J. J. Stekly, T. A. deWinter, and A. El Bindari. Nov 61, 30p. incl. illus. 13 refs. (Research rept. no. 119)
(In cooperation with American Electric Power Service Corp.)
Unclassified report

DESCRIPTORS: (Tests and Design of *Magnetohydrodynamics, *Generators, Coils, Magnetic fields.) (Temperature, Cryogenics, *Superconductivity, Cooling.) (Heat transfer, Conductivity.) Integral equations.

The basic requirements for MHD generator coils are set forth and performance of a typical MHD generator with room temperature, cryogenically cooled, and superconducting coils is analyzed. Various geometric configurations are considered for producing high magnetic fields parallel and perpendicular to the axis of a cylindrical volume. These configurations are compared on the basis of maximum field per unit power expenditure, maximum field per unit mass of conductor and uniformity of field in the region of interest. Comparison is made between water cooled, cryogenically cooled and superconducting coils. Their respective areas of application are defined and the problems associated with each are discussed. (Author)

AD-272 841 Div. 25
(TISTP/MFA) OTS price $7.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
ELECTROMAGNETIC WAVE PROPAGATION THROUGH A PLASMA; THEORETICAL AND EXPERIMENTAL STUDIES,
comp. by George R. Evans. Jan 62, 73p. (Special bibliography no. SB-61-56; Rept. no. 3-80-61-34)
Unclassified report

DESCRIPTORS: (*Bibliography and Abstracting of *Plasma physics, *Electromagnetic waves, Wave transmission, Microwaves.) (Theory, Experimental data and Feasibility studies.)

Although the compilation includes references on the propagation of any type of e.m. wave through a plasma, the primary concern of the search is the influence of a plasma on the propagation of microwaves; i.e., radar and telemetry. The period covered is generally from 1950 to date. In addition to using the facilities of the Technical Information Center, LMSC and ASTIA, the following indexes and abstracting services were checked: AERO/SPACE Engineering, 1959-60; Aeronautical Engineering Index, 1950 - 1958; Engineering Index; International Aerospace Abstracts; Inst. of Radio Eng. Proc. Abstracts and References; and Science Abstracts, A: Physics. (Author)

AD-272 843 Div. 25, 20
(TISTP/MFA) OTS price $12.00

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
RESEARCH ON PARAMAGNETIC RESONANCES.
Final rept. and Quarterly progress rept. no. 4,
by R. L. Kyhl and M. W. P. Strandberg.
15 Oct 61, 152p. incl. illus. tables, refs.
(Contract DA 36-039-sc-87376, DA proj. 3A-99-21-021-04)
Unclassified report

DESCRIPTORS: (Solid state physics, *Masers in Paramagnetic crystals, *Paramagnetic resonance.) (*Ruby, Crystal structure, Lattices, *Relaxation time, Nuclear spins, Polarization.) (Quantum mechanics, *Nuclear energy levels, Electromagnetic fields.) (Tests and Measurement by Instrumentation, Klystrons, Oscilloscopes, Pulse generators, Wavemeters.)

A discussion of the time dependence of the re-

laxation of a spin system in equilibrium with the lattice is given. An analysis of the paramagnetic system under fast passive conditions is presented. The final status of the reactance-compensated maser amplifier is described. Some results on frequency stability in terms of the significant parameters for maser amplifiers are given. Preliminary results on the improvement of optical masers with the use of mode-correcting techniques are indicated. (Author)

AD-272 868 Div. 25, 4
(TISTM/EJH) OTS price $4.60

Applied Physics Lab., Johns Hopkins U., Silver Spring, Md.
GAS THERMAL CONDUCTIVITY STUDIES AT HIGH TEMPERATURE: THE LINE SOURCE TECHNIQUE AND RESULTS IN N2, CO2, AND N2-CO2 MIXTURES,
by A. A. Westenberg and N. deHaas. Dec 61, 33p. incl. illus. tables, 27 refs. (Rept. no. CM-1004)
(Contract NOrd-7386)
Unclassified report

DESCRIPTORS: (*Nitrogen, *Carbon dioxide, Mixtures, Gases, High temperature research, *Thermal conductivity, Thermodynamics, Gas flow, Theory, Test methods.)

A new technique for measuring the thermal conductivity of gases over a fairly wide temperature range is described. The method uses precise measurements of the thermal wake width downstream of a steady line source of heat in a uniform laminar flow of the test gas. The technique was tested on N2 and CO2 over the range 300-1100 K with results that agree well with previously reported work. Measurements on N2 - CO2 mixtures covering the entire composition range and in the same temperature interval are also presented. These are compared with kinetic theory calculations. The results were used to predict the thermal conductivity of N2, CO2, and N2 - CO2 mixtures up to 2000 K. (Author)

AD-272 872 Div. 25
(TISTP/MFA) OTS price $2.60

Microwave Lab., Stanford U., Calif.
GENERAL STUDIES IN HIGH-POWER MICROWAVE CONCEPTS.
Quarterly rept. no. 18, 1 July-30 Sep 61.
Nov 61, 21p. incl. illus. table, 9 refs. (ML rept. no. 877; Scientific rept. no. 35)
(Contract AF 19(604)1930, Proj. 4619)
(AFCRL-1124) Unclassified report

DESCRIPTORS: (*Feasibility studies and Abstracting of Scientific research on *Microwave equipment and *Plasma physics.) Research program administration.

Contents:
Microwave tube studies
Crossed-field electron guns
Electrostatic beam-type parametric amplifier
Plasma physics studies
Electron beam interaction with a plasma
Plasma parametric amplifier
High-frequency diagnostic techniques for plasmas
Thermal plasmas
Nonlinear plasma theory
Noise in plasmas
Plasma diagnostic techniques
Variational methods in plasma physics
Electron beam interaction with a cesium plasma
Harmonic generation in plasmas
Studies of plasma oscillations

AD-272 909 Div. 25
(TISTP/MFA) OTS price $6.60

AeroChem Research Labs., Inc., Princeton, N. J.
CONVECTIVE HEAT TRANSFER WITH CHEMICAL REACTION. II. EXPERIMENTAL STUDIES OF HEAT TRANSFER FROM COMBUSTION GASES TO SOLID SURFACES.
Final rept.,
by Daniel E. Rosner. Aug 61, 56p. incl. illus. tables, 53 refs.
(Contract AF 33(616)6216, Proj. 7013)
(ARL-99, pt.2)
Unclassified report

DESCRIPTORS: (*Heat transfer and Thermal conductivity of *Rocket propellants to Solids.) (*Transport properties and Combustion of Gases, Air, Ethylenes, Oxygen, Hydrogen.) (*Explosions in Pressure capsules, Temperature, Pressure, Thermodynamics, High-pressure research, Cooling.) (Instrumentation and Laboratory equipment.) (Functions, Partial differential equations.)

A novel method of measuring steady state heat fluxes to strongly cooled catalytic and non-catalytic solids within subatmospheric flames is described and used to obtain heat flux data as a function of position in flat ethylene/air and hydrogen/oxygen flames stabilized on a 4-inch diameter burner. For determining energy transport properties of gases at pressures up to or exceeding 1000 psi, a constant volume explosion technique is introduced. Factors limiting the attainable accuracy of emissivity and thermal diffusivity determinations are quantitatively discussed. In view of the theoretical potentialities of the technique, a series of preliminary explosion experiments were carried out using stoichiometric hydrogen/oxygen mixtures in a cylindrical vessel. (Author)

AD-272 911 Div. 25, 14, 1
(TISTM/EJH) OTS price $8.60

Douglas Aircraft Co., Inc., El Segundo, Calif.
SONIC FATIGUE DAMPING SYSTEM DEVELOPMENT.
Final rept. Apr 60-Jan 61,
by J. R. Rhoads. Feb 61, 1v. incl. illus. tables, 19 refs. (Rept. no. ES 40223)
(Contract NOa(s) 60-6072c)
Unclassified report

DESCRIPTORS: (*Airframes, Airplane panels, Sheets, Steel, Aluminum alloys, Vibration, Jet acoustic oscillations, *Damping, Adhesion, Viscosity, Elasticity, Acoustic insulation, *Vibration isolators, Materials, Coatings, *Plastic coatings, Rubber coatings.) (Polymers, Butadienes, Vinyl radicals, Nylon, Epoxy resins, Powder metals, Additives.) (Aluminum, Foils, Laminates, Adhesives.) Test methods.

Polymer compositions were evaluated to obtain information required for efficient damping coatings for aircraft structures subject to sonic fatigue. Reduced test data in the form of ratios indicating stress reduction due to damping and also due to adhesion between structural elements are presented. From these ratios, combined efficiencies were determined and are used as the basis for classifying the materials into efficiency categories between -65 and 180 F., and at frequencies of 150 and 300 cycles/sec. The high stress reduction percentages obtained from the combined mechanisms, indicate the efficiency of additive damping coatings. Test results indicated that a viscoelastic layer between 2 rigid surfaces produced a highly effective damping system. This configuration was obtained on a minute scale by the use of leafing pigments in a viscoelastic base. (Author)

AD-272 928 Div. 25
(TISTM/EJH) OTS price $3.60

Servomechanisms, Inc., Goleta, Calif.
ARMY/NAVY INSTRUMENTATION PROGRAM. PART I.
MAGNETIC FILMS SURVEY.
Summary rept. pt. 1, for 1961,
by Frederic Schuler. 31 Dec 61, 29p. incl.
illus. 25 refs. (Rept. no. SMIR 62-1)
(Subcontract to Douglas Aircraft Co., Inc.,
El Segundo, Calif., Contract Nonr-107600)
Unclassified report

DESCRIPTORS: (*Thin films, *Dielectric films, Metal films, Magnetic materials, Materials, Manufacturing methods, Metallic smoke deposits, Nickel alloys, Iron alloys, Cobalt alloys, Surfaces, Glass, Physical properties, Magnetic properties.) Solid state physics.

The object of this summary is to list and define important thin magnetic film parameters necessary for the design of devices and to present a review of the magnetic film research done at this company during 1961. The purpose of this research is basic support of the stepping register development program. Items discussed include: definitions of film preparation conditions; definitions on generalized film geometry; and definitions on magnetic properties.

AD-272 929 Div. 25
(TISTM/EJH) OTS price $2.60

Servomechanisms, Inc., Goleta, Calif.
ARMY/NAVY INSTRUMENTATION PROGRAM. PART II.
ELECTROLUMINESCENT THIN FILMS.
Summary rept. pt. 2, for 1961,
by E. J. Soxman. 1961, 22p. incl. illus. 6 refs.
(Rept. no. SMIR 62-3)
(Subcontract to Douglas Aircraft Co., Inc., El
Segundo, Calif., Contract Nonr-107600)
Unclassified report

DESCRIPTORS: (*Thin films, *Dielectric films, Magnetic materials, *Luminescent materials, Luminous pigments, *Phosphors, Materials, Metallic smoke deposits, Zinc compounds, Sulfides, Catalysts, Powder metals, Manganese, Surfaces, Glass, Photoemission, Excitation, Electricity.) Manufacturing methods, Vacuum apparatus.

A procedure was developed for producing an electroluminescent thin film of Mn activated ZnS by a one-step process of coevaporation of a mixture of ZnS and Mn metal powder. GeO2 was a satisfactory dielectric layer compatible with the phosphor. Evaporated Al and Mo were satisfactory for the top electrodes. Mo offered an optical advantage in that a film which was semitransparent in the visible range could be used. A d.c. bias superimposed on a pulsed signal was observed first to decrease the emission intensity of the thin film electroluminescence, then after a certain threshold value had been reached to increase the emission intensity through an ac-dc enhancement effect. (Author)

AD-272 930 Div. 25, 14
(TISTM/GEC) OTS price $4.60

Servomechanisms, Inc., Goleta, Calif.
ARMY/NAVY INSTRUMENTATION PROGRAM. PART III.
A SELECTION OF PHYSICAL EFFECTS AND SOME OF
THEIR IMPLICATIONS IN RECENT MATERIALS RESEARCH.
Summary progress rept. pt. 3, Feb-Dec 61.
Dec 61, 28p. illus. tables (Rept. no. SMIR 62-4)
(Subcontract to Douglas Aircraft Co., Inc., El
Segundo, Calif., Contract Nonr-107600)
Unclassified report

DESCRIPTORS: (Theory, Production of *Energy for Transducers, Data processing systems, Display systems.) (Electrons, Lattices, Surfaces, Electromagnetic effects, Particles, Mechanical properties, Thermodynamics effects on *Materials.) Magneto-optic rotation, Electron optics.

A study of the conversion of energy from one form to another and a compilation and analysis of a wide variety of effects in physics was made. The study was restricted to those effects emphasizing the importance of materials. The results of the study were tabulated indicating the types of effects noted and the materials and the functions of the materials affected. (Author)

AD-272 935 Div. 25
(TISTP/MFA) OTS price $3.60

Republic Aviation Corp., Farmingdale, N. Y.
MAGNETIC FIELD MEASUREMENTS IN A CYLINDRICAL
PINCH TUBE,
by T. Donner and L. Aronowitz. 8 Aug 61, 31p.
incl. illus. tables, 4 refs. (Rept. no. PPL-TR-
61-18(415))
(Contract AF 49(638)552)
(AFOSR-1762) Unclassified report

DESCRIPTORS: (Measurement of *Magnetic fields in *Magnetic pinch, *Discharge tubes, Nitrogen, Plasma physics.) (Tests, Experimental data, Photographic analysis.) Oscillographs, Perturbation theory.

Magnetic field measurements in a cylindrical linear pinch tube with magnetic probes and a device named the D-loop are described. Tests were performed with a discharge current frequency of 20 kc in nitrogen at an initial pressure of 0.1 mm Hg. Initial capacitor voltage was varied from 1000 to 5000 volts. Plots of the magnetic field distribution, the radial current distribution and the current density in the pinch tube are presented. Experimental results indicate that the discharges are symmetric above 2000 volts. The symmetric discharges have the following characteristics. At the start of the discharge, current flows near the outer periphery of the pinch tube. A portion of the current concentrates in a thin shell which moves towards the axis at a high velocity. The remainder of the current flows between the rapidly advancing shell and the outer radius of the pinch tube. There is some evidence that after the formation of the first shell a second shell is formed and moves toward the axis. It appears that magnetic probes sometimes cause perturbations in the discharge which influence their output. (Author)

AD-272 947 Div. 25, 17, 22
(TISTM/BRW) OTS price $3.00

American Machine and Foundry Co., Niles, Ill.
MECHANICS OF PENETRATION. VOLUME I. METALLIC
PLATES, THEORY AND APPLICATIONS.
Final technical rept. on Phases 1 and 2,
by L. E. Fugelso, A. A. Arentz, Jr., and J. J.
Poczatek. 31 Oct 61, 1v. incl. illus. 20 refs.
(Rept. no. MR-1127)
(Contract DA 19-129-qm-1542, Proj. 7-80-05-
001)
Unclassified report

DESCRIPTORS: (*Solid state physics, *Terminal ballistics, *Penetration, *Metal plates, Armor plate, Body armor, Projectiles, Impact shock, Compression shock, Shock waves, Energy, Motion, Theory.) (Thermodynamics, Thermal stresses, Irreversible processes, Relaxation time.) Mechanics, Continuum mechanics, Fracture (Mechanics), Fatigue (Mechanics), Failure (Mechanics), Physical properties, Elasticity, Plasticity, Plastic flow, Stresses, Deformation, Lattices, Equations of state, Mathematical analysis.

The elastic equation and dynamic plastic equations of motion for the stresses and displacements in a metallic plate under impact of a metallic cylindrical punch are analytically and numerically solved. An elementary theory for time to fracture under high, rapid stresses is developed. Several engineering applications arising in thin plate penetration are solved by utilizing the theory. (Author)

AD-272 948 Div. 25
(TISTP/MFA) OTS price $1.10

Aerospace Corp., Los Angeles, Calif.
DETERMINATION OF TEMPERATURE PROFILES IN TRANSPARENT GASES FROM RELATIVE LINE INTENSITIES,
by Daniel B. Olfe. 8 Dec 61, 7p. (Rept. no. TDR-930(2210-05)TN-1)
(Contract AF 04(647)930)
Unclassified report

DESCRIPTORS: (Measurement of *Temperature in *Gases, High temperature research, *Gas ionization.) (Functions, Potential theory.)

A method is described which permits the experimental determination of the temperature profile of a column or slab of gas at high temperature. The gas is assumed to be optically transparent. Equations are derived which allow the calculation of the temperature profile from measured relative line intensities. (Author)

AD-272 954 Div. 25, 20, 8
(TISTP/MFA) OTS price $1.60

General Atomic Div., General Dynamics Corp., San Diego, Calif.
MECHANISMS OF TRANSIENT RADIATION EFFECTS STATE OF THE ART,
by V. A. J. Van Lint. Jan 62, 12p. (Rept. no. GA-2886)
(Contract DA 49-186-ORD-939)
Unclassified report

DESCRIPTORS: (Excitation of *Electrons in Gases, Semiconductors and Metals.) (*Recombination reactions, *Transport properties, Ionization.) (Secondary emission, Nuclear energy, Gamma rays, Conductivity.) (Electronic equipment, Capacitors, Resistors, Transistors, Transmission lines, Electric cables.)

The present state of knowledge concerning mechanics of transient radiation effects is described. Some examples of the application of this knowledge to an understanding of the behavior of electronic components subjected to a pulse of nuclear radiation are presented. The subject of transient radiation effects is defined to include those manifestations of the interaction of radiation with matter ascribable to the excitation and de-excitation of electrons. This subject is therefore complementary to displacement radiation effects, in which the displacement of atoms from their normal lattice sites is the important manifestation of an irradiation. Also discussed are: (1) the processes by which electrons are excited and de-excited in various materials, (2) the macroscopic physical manifestations of these electronic perturbations, (3) the correlation between the type of incident radiation and transient effects, and (4) some typical changes in property of electronic components resulting from these interactions. (Author)

AD-272 956 Div. 25, 22
(TISTP/WH) OTS price $9.10

Illinois U., Urbana.
THE ANALYSIS OF THE DYNAMIC RESPONSE OF AN ABOVE-GROUND SIMPLY SUPPORTED CYLINDRICAL SHELL SUBJECTED TO BLAST LOADING,
by J. W. Melin and A. R. Robinson. Aug 61, 94p. incl. illus. tables.
(Contract AF 29(601)2591)
(AFSWC TR 61-55) Unclassified report

DESCRIPTORS: (*Load distribution, Loading of Hemispherical shells and *Structural shells by *Blast and Shock waves.) (Stresses, Elasticity, Mathematical analysis.)

The purpose of this analysis is to determine the elastic response of an above ground, simply supported shell roof subjected to a blast loading. The analysis is divided into four parts: (1) a review of the blast loading phenomena, and an evaluation of the forces which might reasonably be expected to act on the structure; (2) a derivation and discussion of the equations of motion of the shell; (3) development of a solution to the equations of motion which would be suitable for programing for a digital computer; and (4) a preliminary study to establish which parameters are most important, and the general effects of these parameters. (Author)

AD-272 973 Div. 25
(TISTW/RD) OTS price $3.60

Antenna Lab., Ohio State U. Research Foundation, Columbus.
A THEORETICAL ANALYSIS OF THE OPTICAL FARADAY ROTATION AND ITS APPLICATION,
Rept. on Study of Unique Detection Techniques,
by William S. Chang. 1 Sep 61, 34p. incl. illus. 31 refs. (Rept. no. 1040-2)
(Contract AF 33(616)6849, Proj. 1670-4075)
Unclassified report

DESCRIPTORS: (Analysis of Theory of *Magneto-optic rotation in Paramagnetic salts.) (Microwaves, Resonance absorption.) (Magneto-optic rotation of Light.) (Microwaves, Modulation of Light.)

Contents:
The macroscopic analysis
The microscopic analysis of Faraday rotation in paramagnetic salts
The Faraday rotation of light
The interaction of Faraday rotation and microwave resonance absorption
The use of Faraday rotation to measure spin-lattice relaxation processes
The Faraday rotation microwave-optical detector
The microwave modulation of optical light

26. PRODUCTION AND MANAGEMENT

AD-272 515 Div. 26, 17, 1, 12
(TISTM/BRW) OTS price $4.60

Westinghouse Electric Corp., Blairsville, Pa.
HIGH ENERGY RATE EXTRUSION.
Interim technical progress rept. no. 5, on Phase 2, 1 Oct-27 Dec 61,
by J. M. Rippel. 27 Dec 61, 38p. illus. tables.
(Contract AF 33(600)41948, Proj. 7-882)
(ASD TR 7-882, vol. 5)
Unclassified report

DESCRIPTORS: (*Machine tools, *Metals, *Extrusion, Explosive forming, Pneumatic systems, Hydraulic systems.) (Manufacturing methods, Feasibility studies, Processing, Steel, Stainless steel, Titanium alloys, Aluminum alloys, Aluminum, Vanadium alloys.) (Dies, Tools, Design.) (Pressure, Motion, Deceleration, Velocity, Instrumentation.) Airframes, Structures, Aircraft, Spaceships.

The investigation of the high energy rate extrusion process has been continued. Inertial separation, the tensile failure of the extrusion due to its rapid deceleration, imposes a serious limitation to a successful process for making 10 ft. lengths in one piece. This report covers the investigation into the parameters that directly affect this phenomenon. These parameters include machine mass, investigated on both a 1210 model and 1810 model Dynapak, billet size and reduction ratio. Work on magnetic and mechanical decelerators is included with pictures and descriptions of extrusions. (Author)

AD-272 526 Div. 26, 17, 12
(TISTM/BRW) OTS price $1.10

McDonnell Aircraft Corp., St. Louis, Mo.
MOLYBDENUM STRUCTURAL COMPONENT PROGRAM.
Progress rept. 1 Nov 61-1 Feb 62,
1 Feb 62, 12p. incl. illus.
(Contract NOw 61-06553)
Unclassified report

DESCRIPTORS: (*Molybdenum alloys, Titanium alloys, Zirconium alloys, Sheets, *Niobium, Rivets, Bolts, Nuts (Mechanics)). (Metal joints, Bolted joints, Riveted joints, *Coatins, Metal coatings, Antioxidants, Silicon coatings, Refractory coatings, Aluminum coatings, Chromium compounds, Niobium, Molybdenum.) (Templates, Chemical milling, Forging.) (High temperature research, Structures, Spaceships, Airframes, Design.)

Progress is reported on the Mo structural components. Coating vendors were interviewed to determine the most economical design and assembly procedure for the rudder from a coating standpoint. Compatibility studies of Mo-coated and Nb-coated parts were completed. Pre-production Mo material which could be used for preliminary evaluation was selected for rolling for the detail fabrication evaluation. The rudder fittings cannot be made as Mo or Nb forgings under Westinghouse or Crucible Steels study program. The blanking of Mo parts by Chem-Milling was investigated. (Author)

AD-272 555 Div. 26, 14, 17, 12
(TISTM/BRW) OTS price $13.50

Westinghouse Electric Co., East Pittsburgh, Pa.
ANALYTICAL AND EXPERIMENTAL STUDY OF ADAPTING BEARINGS FOR USE IN AN ULTRA-HIGH VACUUM ENVIRONMENT. PHASE I. SCREENING OF WEAR AND FRICTION characteristics of plastics, dry powders, composites, and alloys,
by P. H. Bowen. Feb 62, 192p. incl. illus. tables.
(Contract AF 40(600)915, Proj. 7778)
(AEDC TDR 62-51) Unclassified report

DESCRIPTORS: (*Lubrication, *Gears, *Ball bearings, Low pressure research, Materials, Friction, Evaporation.) (Lubricants, *Powders, Solids, Porous materials, *Plastics, Bearings, *Alloys, Cermets, Powder metals, Sintered alloys.) (Test equipment, Vacuum apparatus.)

This report includes:
ANALYTICAL AND EXPERIMENTAL STUDY OF ADAPTING BEARINGS FOR USE IN AN ULTRA-HIGH VACUUM ENVIRONMENT. PHASE II. OUTGASSING DETERMINATION OF PLASTICS, DRY POWDERS, AND COMPOSITES, by P. H. Bowen.

ANALYTICAL AND EXPERIMENTAL STUDY OF ADAPTING BEARINGS FOR USE IN AN ULTRA-HIGH VACUUM ENVIRONMENT. PHASE III. EVALUATION OF DRY POWDER LUBRICANTS AND SELF-LUBRICATING MATERIALS IN ULTRA-HIGH VACUUM BEARING TESTS, by P. H. Bowen.

An investigation was made of the lubrication of gears and bearings in vacuum environments by using dry powders as a lubricant, and dry self-lubricating materials in the bearing retainer. The wear and friction characteristics of various dry powders and dry self-lubricating materials were evaluated. The materials included reinforced thermosetting plastics, dry lubricant filled and unfilled thermoplastics and dry lubricant filled sintered alloys. (Author)

AD-272 602 Div. 26, 1, 12
(TISTM/BRW) OTS price $6.60

Boeing Co., Seattle, Wash.
STANDARDIZED UNIVERSAL TOOLING SYSTEM: JIG FRAMES AND RELATED MOUNTING, STORAGE, TRANSPORTATION AND HOISTING EQUIPMENT, AND GENERAL PURPOSE HOISTING.
Technical manual.
11 Oct 61, 62p. incl. illus.
(Contract AF 33(600)41845)
(ASD TR 61-7-829, vol. 2)
Unclassified report

DESCRIPTORS: (Design, Standardization, *Industrial equipment, *Jigs, Tools.) (*Tools, Airframes, Aircraft industry.) Industrial production, Instruction manuals, Specifications.

The manual concerns the selection and usage of the items of equipment comprising a standardized system of tools. Its purpose is to inform tool and production planners, engineers and tool designers of the capabilities, limitations, and methods of application of the equipment in order that the full benefits of standardization can be achieved through proper usage. The tooling system is comprised of a series of incremental sized rectangular, square and round jig frames to be used for assembling aircraft and missile components. It includes related items of equipment for trunnion mounted support arrangements of

the frames. Also included is storage, transportation and hoisting equipment for frame handling in fabrication, storage and assembly areas. The hoisting equipment is intended for lifting aircraft and missile component parts in addition to standard jig frames. (Author)

AD-272 603 Div. 26, 1, 12
(TISTM/BRW) OTS price $5.60

Boeing Co., Seattle, Wash.
STANDARDIZED UNIVERSAL TOOLING SYSTEM: JIG FRAMES AND RELATED MOUNTING, STORAGE, TRANSPORTATION AND HOISTING EQUIPMENT, AND GENERAL PURPOSE HOISTING. DETAILED DESIGN SPECIFICATION.
11 Oct 61, 58p. incl. illus.
(Contract AF 33(600)41845)
(ASD TR 61-7-829, vol. 3)
Unclassified report

DESCRIPTORS: (Design, Standardization, *Industrial equipment, *Jigs, Tools.) (*Tools, Airframes, Aircraft industry.) (Industrial production, Instruction manuals, Specifications.)

The specification outlines the characteristics and performance requirements of equipment items included in a standardized universal tooling system. The system is comprised of a series of incremental sized rectangular and round jig frames and related items of equipment for trunnion mounted support, storage, transportation, and hoisting of the frames in the fabrication, storage and assembly areas of plants. The hoisting equipment is also intended for lifting aircraft and missile components during manufacturing operations. (Author)

AD-272 656 Div. 26, 27, 17
(TISTM/BRW) OTS price $1.10

Massachusetts Inst. of Tech., Div. of Sponsored Research, Cambridge.
EVALUATION OF ELECTRON BEAM WELDING FOR FABRICATION OF ULTRA HIGH STRENGTH STEEL ROCKET MOTOR CASES.
Monthly status rept. no. 12, 1-30 Apr 61, by C. M. Adams, Jr. 14 Feb 62, 3p. incl. table.
(Contract NOw 60-0417)
Unclassified report

DESCRIPTORS: (*Rocket cases, *Welding, *Steel, Sheets, Processing, Manufacturing methods.) (Arc welding by Electrodes, Tungsten, Gases, Shielding vs Electron beams, Welds, Mechanical properties, Fracture (Mechanics), Hardening, Effectiveness, Heat treatment.)

Further determinations were made of the ultimate tensile strength, yield strength, and bi-axial tensile strength of electron beam and tungsten inert gas (TIG) welds. The magnitude of the strengthening effect is expressed as a percentage of the uni-axial ultimate tensile strength. In all of the TIG welded uni-axial tensile specimens, fracture took place within the weld metal or heat-affected zone so that the magnitudes of bi-axial strengthening were characteristic of the weld metal. A comparison of the results obtained with the uni-axial and bi-axial electron beam welded test specimens show a strength increase between 20 and 30%; fracture of electron beam weldments rarely took place in the weld. A comparison of uni-axial and bi-axial strengths indicates that electron beam weld metal is at least as strong as the base material and is somewhat stronger than TIG weld metal. Electron beam weld metal is very responsive to the strengthening effects of bi-axial loading, probably because of the near absence of micro-flaws in a rapidly solidified vacuum deposited structure. (Author)

AD-272 899 Div. 26
(TISTW/DLW) OTS price $3.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
EXPERIMENTAL DETERMINATION OF STABILITY BOUNDARIES FOR AN EXTERNALLY-PRESSURIZED, GAS-LUBRICATED THRUST BEARING.
Interim rept.,
by Charles Stevenson and Lazar Licht. Feb 62, 35p. incl. illus. tables, 2 refs. (Rept. no. I-A2049-19)
(Contract Nonr-234200)
Unclassified report

DESCRIPTORS: (*Thrust bearings, *Gas bearings, Lubrication, Pressure, Stability, Oscillation, Perturbation theory, Tests, Measurement.)

Stability boundaries are determined experimentally for a circular, externally-pressurized, air-lubricated thrust bearing. The loci are presented on load versus supply pressure plots, showing the effects of variation of the following parameters on the stability of a 5 in. diameter bearing with a 1 in. diameter, centrally located recess: (1) recess depth, (2) total throat area of supply nozzles, and (3) rotor mass. The influence of entrance effects in the region of admission of the bearing gap is investigated qualitatively. Results are discussed with reference to stable bearing design and operation and recommendations are made for future theoretical and experimental work. (Author)

AD-272 951 Div. 26, 30
(TISTB/AW) OTS price $2.50

Aerospace Corp., Inglewood, Calif.
THE OPERATIONAL PERT SYSTEM.
Aug 61, 121p. incl. illus. (Rept. no. TDR-930 (2408)-TR-1)
(Contract AF 04(647)930)
Unclassified report

DESCRIPTORS: (*Management engineering, Analysis, Scheduling, Production, *Research program administration.)

The manual contains an interpretation of the fundamental Program Evaluation and Review Technique (PERT) and defines an operational system based on this interpretation, encompassing operational procedures, report forms, and analysis techniques unique to this system. In addition, the manual includes flow charts depicting the operational cycle, a glossary of the terms used in the system, and a description of the TOPS dictionary. (Author)

AD-272 977 Div. 26, 17, 27
(TISTM/BRW) OTS price $1.10

Rolla Metallurgy Research Center, Bureau of Mines, Mo.
VAPOR DEPOSITION OF TUNGSTEN AND THE EFFECTS OF

PROCESS VARIABLES.
Monthly progress rept. no. 4 for Feb 62,
by F. W. Hoertel. Feb 62, 3p.
Unclassified report

DESCRIPTORS: (Metal coatings by *Vapor plating of *Tungsten by Pyrolysis of Mixtures of Gases, Hydrogen, Tungsten compounds, Fluorides.) (Grains (Metallurgy), Crystal structure, Microstructure, Hardness, Chemical impurities, Silicon.) *Rocket motor nozzles, Coatings, Metallic smoke deposits.

Tungsten deposited by using various ratios of H and WF6 had a coarse-grained columar microstructure. The grain size of the deposits was approximately the same. Knoop microhardness values ranged from 402 to 512. Total metallic impurities were 23 to 60 ppm with Si, the major impurity, ranging from 12 to 28 ppm. No correlation between the reactant-gas ratio and microhardness, grain size, or concentration of impurities was detected. (Author)

27. PROPULSION SYSTEMS

AD-272 560 Div. 27, 14, 26
(TISTM/EJH) OTS price $1.60

Aerojet-General Corp., Azusa, Calif.
DEVELOPMENT OF IMPROVED HIGH-STRENGTH PREIMPREGNATED MATERIALS FOR FILAMENT-WOUND ROCKET MOTOR CASES.
Informal progress rept. no. 5, 1-31 Dec 61.
26 Jan 62, 6p. tables (Rept. no. L0525-01-5)
(Contract NOw-61-0642-c)
Unclassified report

DESCRIPTORS: (*Rocket cases, *Filament wound construction, Materials, Fibers, *Synthetic fibers, Filaments, Glass textiles, Impregnation, Coatings, Resins, Heat resistant polymers.) High pressure research, High temperature research, Tensile properties, Failure (Mechanics), Tests.

Lots 1 through 5 of experimental roving were received; all except Lots 4 and 5 were coated with E-787 resin. The strand tensile strength for all except Lot 2 was 340,000 psi or over. The highest hoop filament stress obtained occurred during this report period. An 18-in. chamber fabricated from Lot 3 pre-preg failed at a glass stress of 333,300 psi. Due to the gains made in catenary, fuzz content, and damage protection with the improved Lot 1 package it was decided that these properties which were to be studied in Lots 6, 7, and 8 could not be improved further at this time; substitute parameters were requested for these lots. The only substitution made is for a lot with smaller diameter fibers consisting of approximately 400 filaments per end instead of the usual 204 filaments. A statistical analysis, using an Aerojet IBM 7090 computer, was initiated to evaluate 8 process variables. (Author)

AD-272 564 Div. 27, 26, 17
(TISTM/BRW) OTS price $1.60

General Electric Co., Cincinnati, Ohio.
DEVELOPMENT OF ROLL-FORMED TUNGSTEN NOZZLE COMPONENTS.
Progress rept.
9 Jan 62, 7p. illus. (Rept. no. DM 62-55)
(Contract NOw 61-0161-c)
Unclassified report

DESCRIPTORS: (*Rocket motor nozzles, *Tungsten, Sheets, Processing, *Manufacturing methods.) (Tools, Design.) (Conical bodies of Metal plates, Production, Lathes.)

Progress is reported on the manufacture of W nozzle inserts by the roll-forming process. A liner backed up with A.T.J. graphite failed during the early part of the firing of the first assembly. Failure analysis indicated a possible improvement by flanging the inlet section. (Author)

AD-272 652 Div. 27, 14, 12
(TISTM/BRW) OTS price $1.60

Kidde, Walter, and Co., Inc., Belleville, N. J.
FIBERGLASS MOTOR CASE STUDY. POLARIS SECOND STAGE END CLOSURE.
Interim progress rept., 1-31 Jan 61,
by T. Siuta. 13 Feb 62, 10p. incl. illus. tables (Rept. no. 3642-10)
(Contract NOw 61-0497-c)
Unclassified report

DESCRIPTORS: (*Rocket cases, Glass textiles, Filament wound construction, Design.) (Model tests, Hydrostatic pressure, Hemispherical shells, Deflection, Equations.) (Guided missiles, Underwater to surface.) Data.

A second hydrostatic deflection test was performed on a scale model rocket case to substantiate original test data and to check whether deflections are influenced in a different manner on the second pressurization cycle. This simulates actual usage. The rate of pressurization and associated test conditions remained unchanged to permit a direct comparison with previous results. Deflections were obtained on the forward and aft dome closures at 200, 350, and 450 psig. Maximum deflections occurred in the area of the polar fittings. A direct comparison with the previous test showed that the aft dome closure deflections were slightly larger. Forward dome deflections were in good agreement with the original test. Additional deflection data was reduced on the retest to aid in the determination of the equation governing deflections; a significant portion of the total deflection in the area of the polar fitting occurred during initial pressurization (100-psig). An empirical equation for the deflection characteristics of the forward and aft dome contour was derived for models of different sizes. (Author)

AD-272 886 Div. 27, 14
(TISTM/BRW) OTS price $4.60

Bendix Systems Div., Bendix Corp., South Bend, Ind.
SERVICES TO GENERATE ENGINEERING DATA ON THE BEHAVIOR OF PLASTIC COMPOSITE STRUCTURES UNDER VARIOUS CONDITIONS OF STRESS.
Rept. on Phase 1,
by Paul Vanderburgh. 23 Feb 62, 30p. incl. illus. tables (Rept. no. BAE-863-14367)
(Contract NOw 61-0488-c)
Unclassified report

DESCRIPTORS: (Structures, *Rocket cases, Pressure vessels, Filament wound construction, *Glass textiles, Reinforcing materials, *Plastics, Resins, Laminates.) (Tests, Test equipment, Test methods, Stresses, Deformation.)

Progress is reported on investigations of materials and processing methods for pre-preg fiberglass including both tapes and rovings. The D ring test was chosen to permit use of the same test on both materials. Results are presented in the form of a chart of strength vs/wrap tension. The charts show that increasing tension increases strength. Comparisons between charts show that (1) some materials are significantly stronger (over 400 psi glass stress in some cases), (2) higher resin content increases strength at low wrap tensions, (3) a roller diameter of 1 in. appeared more satisfactory than a 4-in. roller, (4) preheating the D ring to 200 F did not affect the strength, and (5) a 2-hr boil reduced strengths by as much as 18%. Autographic curves of load vs strains during some D ring tests are shown. (Author)

28. PSYCHOLOGY AND HUMAN ENGINEERING

AD-272 568 Div. 28
(TISTB/AW) OTS price $8.10

Indiana U., Bloomington.
CONDITIONING AND DISCRIMINATION. THE ALL-OR-NONE PROCESSES IN PAIRED-ASSOCIATE LEARNING,
by Frank Restle. 15 Jan 62, 83p. incl. illus. tables, 14 refs.
(Contract Nonr-90816)
Unclassified report

DESCRIPTORS: (*Psychology, *Learning, Transfer of training, Reasoning, Conditioned reflex, Theory, Mathematical analysis, Probability.)

An analysis is made to show that learning a nonsense-syllable may not be an elementary process, but may involve several stages. The stages are identified, and data are shown to agree with the multi-stage theory. The result is two-fold. One has a better idea of how to produce a truly all-or-nothing learning process, and a more complex analysis of the processes in actual learning experiments can be made. By eliminating almost all stimulus generalization, and by choosing discrete responses, it may be possible to obtain a pure case of conditioning. By eliminating the need for any conditioning, pure cases of discrimination learning can be isolated. If such analyses can be completed successively, it is possible to build problems which are known to consist of several stages. The theory, which makes possible an analysis of extremely complicated data, is intended to be a step toward a mathematical theory of learning which can actually be applied to school learning and other educational problems of general and practical interest. (Author)

AD-272 688 Div. 28
(TISTB/AW) OTS price $6.60

Naval Personnel Research Field Activity, San Diego, Calif.
TRAINING AND PROFICIENCY OF AVIATION STRUCTURAL MECHANICS. II. PROFICIENCY OF FIRST ENLISTMENT AVIATION MECHANICS,
by Earl I. Jones and Alvin J. Abrams. Dec 61, 59p. incl. illus. tables, 3 refs. (Technical bull. no. 61-16)
Unclassified report

DESCRIPTORS: (*Maintenance personnel, Naval personnel, Aviation personnel, Military training, Achievement tests.)

Between July and November 1959, 242 first enlistment aviation structural mechanics and their immediate supervisors were interviewed to provide information on the training, utilization, performance and progress of AM's during their first enlistment. The sample included personnel from 32 squadrons representing 11 squadron types. The primary indications were that fleet training facilities were commonly utilized to prepare AM's for their squadron duties; AMS's and AMH's were assigned to billets with overlapping structures and hydraulics duties throughout their first enlistment; AME's were utilized within the scope of their service rating; and as AM's progressed in time and rate they performed more duties, better, with less supervision, often reaching a level of independent trouble shooting performance within the last year of their first enlistment. (Author)

AD-272 762 Div. 28
(TISTB/AW) OTS price $13.50

Armed Forces-NRC Vision Committee, Washington, D. C.
VISUAL PROBLEMS OF THE ARMED FORCES,
ed. by Milton A. Whitcomb. 1962, 193p. incl. illus. tables, refs.
Unclassified report

Papers presented before the Armed Forces-NRC Committee on Vision, Smithsonian Auditorium, Washington, D. C. 30-31 March 1961.

DESCRIPTORS: (*Symposia, Armed Forces, *Vision, *Visual perception, Space perception, Visual thresholds, Stereoscopic vision, Photographic analysis, Aerial reconnaissance, Dark adaptation.) Astronautics, Warfare.

Contents:
Vision under reduced stimulus conditions
Perceptual problems of space travel
Pictorial display for reconnaissance interpretation
Visual processes and problems of battlefield surveillance in ground warfare

AD-272 827 Div. 28
(TISTB/AW) OTS price $9.10

Applied Psychology Corp., Arlington, Va.
HUMAN FACTORS RATINGS IN DESIGN OF SIGNAL CORPS SYSTEMS.
Final rept.
Oct 61, 102p. incl. tables, 10 refs.
(Contract DA 36-039-sc-78328, Proj. 3-99-00-110)
Unclassified report

DESCRIPTORS: (*Human engineering, *Applied psychology, *Job analysis, Radio operators, Man, Analysis, Measurement, Collecting methods, Effectiveness, Electrical equipment, Communication equipment.)

A final report of the project is presented. The report contains a review of the literature as it relates to this project, a review of the basic methodology developed for analyzing human functions in man-machine systems, a summary of the needs of the design process for human factors data, and a discussion of the development of criteria and specific human factors rating devices for use in design. Complete data collection and scoring instructions and materials are provided. The mathematics for obtaining indices of both task and systems effectiveness are specified and illustrated. The use of indices of task and systems effectiveness as design aids is described. Guide lines for assembling a catalogue of task data are also described. (Author)

AD-272 894 Div. 28, 30
(TISTW/EET) OTS price $3.60

Rand Corp., Santa Monica, Calif.
MECHANISMS UNDERLYING PREDICTIVE BEHAVIOR FOR AN INTELLIGENT MACHINE,
by M. E. Maron. Feb 62, 29p. incl. illus. 8 refs. (Memo. no. RM-3011-PR)
(Contract AF 49(638)700)
Unclassified report

DESCRIPTORS: (Simulation of *Reasoning by *Computers.) *Behavior, Probability, Memory, Learning, Mathematical analysis, Mathematical logic, Cybernetics, Information theory, *Computer logic, Mathematical prediction.

The role of prediction as the key process underlying the function of an intelligent machine is discussed. A model of a neuron is presented which exhibits properties of memory and learning. The formalism of the calculus of probability allows us to interpret the behavior of a neuron in such a way as to justify how a network of such elements can be organized so that it can learn to predict. (Author)

AD-272 915 Div. 28
(TISTW/EET) OTS price $5.60

Human Factors Research, Inc., Los Angeles, Calif.
PERFORMANCE SHARING IN DUAL-MODE MONITORING,
by James J. McGrath. Jan 62, 48p. incl. illus. tables, 23 refs. (Technical rept. no. 740-1)
(Subcontract to Douglas Aircraft Co., Long Beach, Calif., Contract Nonr-107600)
Unclassified report

DESCRIPTORS: *Display systems, *Monitors, Auditory signals, Visual signals, Detection, Attention, Reaction (Psychology), Reaction time, Behavior, Visual perception, Auditory perception, *Human engineering, Theory.

In a previous study of signal detection performance, it was found that when individuals monitored two displays concurrently, detection performance improved on the display presenting more easily detected signals and declined on the display presenting less easily detected signals compared to detection performance on a single display alone. The phenomenon was called performance sharing. Two matched groups of 12 subjects were tested in a series of six 90-minute watchstanding sessions. In two sessions the subjects performed only an auditory vigilance task, in two sessions they performed only a visual vigilance task, and in two sessions they performed both tasks concurrently. In one group the auditory signals were easy to detect, while the visual signals were difficult to detect. In the other group the visual signals were easy and the auditory signals were difficult. A larger per cent of the easy signals were detected under the dual-mode display conditions than under the single-mode conditions; but there was no difference in the per cent of difficult signals detected under the dual-mode and single-mode conditions. Further analysis showed that the performance-sharing phenomenon was attributable to differences in signal detectability and was not attributable to preferences for one sensory modality over the other. (Author)

AD-272 991 Div. 28
(TISTB/AW) OTS price $1.60

Adjutant General, Dept. of the Army, Washington, D. C.
HUMAN FACTORS STUDIES IN IMAGE INTERPRETATION: THE IMPACT OF INTELLIGENCE INFORMATION FURNISHED INTERPRETERS,
by R. Sadacca, A. Castelnovo, and J. Ranes. Aug 61, 16p. incl. tables, 1 ref. (HFRB technical research note no. 117)
(Proj. 2L95-60-001)
Unclassified report

DESCRIPTORS: (*Military intelligence, Photographic intelligence, Reliability, Errors, Standardization, Feasibility studies.)

The objective of the study was to determine whether intelligence information furnished the interpreter influences the accuracy of his reports or the confidence he places in his interpretations. Two closely related experiments were conducted using performance measures based on tactical and strategic photographs. In the first experiment, one group of interpreters received the usual background information. A matched experimental group received additional intelligence information suggesting the presence of particular objects in the imagery. In the second, evaluations of the source and accuracy of the information presented were systematically varied across nine groups of interpreters. In the first experiment, the group receiving the additional intelligence information reported incorrectly the presence of more objects of the type suggested than did the control group, and made more correct identifications of the objects suggested. In the second experiment, there was no evidence that accompanying evaluations of the source and accuracy of the information presented influenced performance. The results indicate that information from other intelligence sources concerning the presence of particular objects can act to suggest the presence of the objects to image interpreters even when the objects are not actually in the imagery. (Author)

Division 29 - QUARTERMASTER EQUIPMENT AND SUPPLIES
Division 30 - RESEARCH AND RESEARCH EQUIPMENT

29. QUARTERMASTER EQUIPMENT AND SUPPLIES

No Entries

30. RESEARCH AND RESEARCH EQUIPMENT

AD-272 570 Div. 30
(TISTP/FR) OTS price $11.00

Land-Air, Inc., Point Mugu, Calif.
LAIRS PROGRAMING MANUAL,
by R. J. Lyon. 12 Jan 62, 141p. incl. illus. tables (Manual no. 19)
(Contract N-123(61756)19425A)
Unclassified report

DESCRIPTORS: (*Digital computers, *Programming.) Experimental data.

The Land-Air Integrated Reduction System (LAIRS) is a production-oriented system for the reduction of scientific data, designed for the IBM 709-7090 computers. The system essentially consists of three parts: a library of subprograms, or data processors, in absolute binary form; input, consisting of control information and data to be processed; and a monitor, which analyzes the control information, calls the appropriate subprograms as indicated therein, and handles input/output as requested by the subprograms. Programing for the system consists of constructing an independent data processor or subprogram in a language from which an absolute binary deck may be obtained, e.g., FAP, FORTRAN, or Mock Donald. (Author)

AD-272 571 Div. 30
(TISTP/FR) OTS price $22.25

Land-Air, Inc., Point Mugu, Calif.
LAIRS SYSTEM MANUAL,
by R. J. Lyon. 12 Jan 62, 401p. incl. illus. tables, refs. (Manual no. 20)
(Contract N-123(61756)19425A)
Unclassified report

DESCRIPTORS: (*Digital computers, *Programming.)

The production-oriented Land-Air Integrated Reduction System for scientific data, designed for the IBM 709-7090 computers is described. The essence of the system is its monitor, which is divided into a Diagnostic and an Execution Supervisor. Flexibility and provision for expansion are explicit in the system monitor and its library of data processors which permit additions, revisions, and substitutions to parts without disturbing any other part. The system is easily adaptable to other problems, such as warehousing, inventorying, or accounting. (Author)

AD-272 599 Div. 30
(TISTP/JW) OTS price $8.60

Boeing Scientific Research Labs., Seattle, Wash.
VARIOUS METHODS AND COMPUTER ROUTINES FOR APPROXIMATION, CURVE FITTING, AND INTERPOLATION,
by J. F. Price and R. H. Simonsen. Feb 62, 94p. incl. illus. tables, 19 refs. (Mathematical note no. 249; Document no. D1-82-0151)
Unclassified report

Also available from the Author.

DESCRIPTORS: (Computers, *Computer logic, Data processing systems.) (Mathematical computer data, *Programming.)

Various types of computer routines are discussed to provide a basis for programmers to determine which types can best be applied to a specific problem. A select group of 7090 programs often recommended to programmers requiring computer routines is presented. Some are original and some are revised 704 SHARE programs. Complete information regarding their usage is given.

AD-272 692 Div. 30, 10
(TISTA/LSK) OTS price $3.60

Aerojet-General Corp., Sacramento, Calif.
CRYOGENIC FLOW MEASUREMENTS.
17 Jan 62, 13p. illus. (Technical memo. no. 149 LRP)
(Contract AF 04(645)8)
Unclassified report

DESCRIPTORS: (*Flowmeters, Liquid level gages, Calibration, Design, Instrumentation.) (*Cryogenics, Liquid rocket propellants, Liquefied gases, Fluid flow, Volume, Measurement.)

The design, construction, activation, and use of a time-volume flowmeter-calibration facility are described. Details of instrumentation and calibration techniques are included, as well as an error analysis. The variance in meter calibration factors from water to liquid oxygen is described. (Author)

AD-272 750 Div. 30
(TISTB/AW) OTS price $1.60

Army Chemical Research and Development Labs., Army Chemical Center, Md.
THE DESIGN OF A PARTICLE-SIZE COUNTER AND ITS AUTOMATIC DATA-COLLECTION SYSTEM,
by Curtis L. Paxton and Martin J. Memolo.
Nov 61, 18p. incl. illus. (Rept. no. CRDLR 3100)
Unclassified report

DESCRIPTORS: (*Particles, Aerosols, Measurement, Analysis.) (Automatic, Collecting methods, *Digital recording systems, Test equipment, Design.)

To facilitate a more rapid and accurate method of assessing and analyzing aerosol droplets deposited on glass slides, a one-hand-operated caliper-type measuring device equipped with an automatic data-collection system was developed. Having received a signal from the caliper indidating the measurement of a discrete particle, the automatic data-collection system will record the information on punched paper tape in a form directly acceptable by those electronic computers

that accept binary-coded decimal paper tape as input. Using the device described, it is possible for one man to measure and record simultaneously on paper tape an average of 60 drops per minute (the maximum being about 180), reducing the man hours per thousand drops to about 0.28. (Author)

AD-272 798 Div. 30
(TISTP/FR) OTS price $3.60

Land-Air, Inc., Point Mugu, Calif.
LAIRS CODING MANUAL,
by R. J. Lyon, D. B. Alexander and others.
12 Jan 62, 35p. incl. illus. (Manual no. 18)
(Contract N-123(61756)19425A)
Unclassified report

DESCRIPTORS: (*Digital computers, *Programming, Coding, Handbooks.)

the Land-Air Integrated Reduction System (LAIRS) is a production-oriented system for the reduction of scientific data, designed for the IBM 709-7090 computers. The system essentially consists of three parts; a library of subprograms, or data processors, in absolute binary form; input, consisting of control information and data to be processed; and a monitor, which analyzes the control information, makes tape assignments, calls the subprograms as specified in the control cards, and handles input/output as requested by the subprograms. The LAIRS Coder's job is to analyze the request for data reduction, prepare the LAIRS Control Cards, LAIRS Subprogram Cards, ETC Cards, ENDJOB, ENDRUN and HEADER Cards as required, perform a desk check of his work, and assemble the job for the machine room. The specifications for card formats, preliminary and final coding, desk check, restart procedure are given. Working forms, flow charts, and a LAIRS Coder's Guide Sheet are included. (Author)

AD-272 801 Div. 30, 25
(TISTW/EET) OTS price $3.60

Randolph-Macon Coll., Ashland, Va.
THE PNEUMATIC ENERGY DETECTOR WITH REMOTE OPTICS (PEDRO).
Quarterly progress rept. no. 2, 1 Oct-30 Dec 61,
by Richard E. Grove, Marvin L. Luther, and
J. Wanzer Drane. 25 Jan 62, 27p. incl. illus. table, 2 refs. (Rept. no. 9)
(Contract N178-7904)
Unclassified report

DESCRIPTORS: (*Electromagnetic fields, *Hazards, Ordnance.) (*Optical instruments, *Detectors, *Thermal radiation.) (Electric detonators, Electric igniters, Thermal radiation, Measurement.) (Diaphragms (Mechanics), Tests, Test equipment, Materials, Pneumatic devices.) (Glass textiles, Optics.)

Further study of the feasibility of the Pneumatic Energy Detector with Remote Optics (PEDRO) for evaluating the hazards of electromagnetic radiation to ordnance is reported. Measurements made on an electrically heated test fixture indicate a power input of 1.6 milliwatts to the one ohm bridgewire of a Mark 1 squib may be detected by diaphragm distention using an optical imaging technique. Correlation is made between the deflections produced by electric heating and by a static differential pressure across the mirrored diaphragm. The design of optical fiber configurations is discussed and prototype designs of the PEDRO sensing head are presented. (Author)

AD-272 828 Div. 30
(TISTB/AW) OTS price $2.60

RAND Corp., Santa Monica, Calif.
THE NATURE OF RESEARCH GOALS. SOME NECESSARY DEFINITIONS,
by E. G. Mesthene and S. MacClintock. Jan 62,
25p. 6 refs. (Memo. no. RM-2858-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (*Research program administration, Analysis, Scientific organizations, Scientific research, Industrial research, Military research.)

Prospective end items are the proper goals of development, and purely intellectual goals govern academic research. In conducting research, industrial and governmental agencies whose missions are other than simply scientific have the problem of defining useful research goals that will at once allow the freedom of inquiry necessary to good research and still offer a reasonable probability that the completed research will be useful to the sponsoring organization. The problem, in short, is to determine the exact nature of the relevance of research to mission that must be embodied in useful research goals. (Author)

AD-272 844 Div. 30
(TISTB/AW) OTS price $9.10

Planning Research Corp., Los Angeles, Calif.
SIMULATION SYSTEM DESIGN FOR A TEAS SIMULATION RESEARCH FACILITY,
by J. D. Dodson. 15 Nov 61, 99p. incl. illus.
6 refs. (Rept. no. PRC R-194; Scientific rept. no. 4)
(Contract AF 19(604)7351)
(AFCRL-1112) Unclassified report

DESCRIPTORS: (*Research program administration, Simulation, Test facilities, Design, Costs.) (War potential, Military intelligence, Military operations, Analysis.) (Warfare, Probability.) Computers.

A conceptual device is described that may be of promise in developing decision-making systems. The device consists of a modification of scientific method embodied on the Bayes theorem and is designated as the modified Bayes theorem (MBT) method. It appears that the MBT method may be of great utility in several roles: in design of a system, in programming, in simulation, in TEAS research, and in evaluating TEAS models. A discussion is presented of some of the considerations affecting the design of a TEAS simulation research facility (TSRF), including some of the elements of the design of such an activity. Finally, highlights of a recommended schedule of research are presented as required for implementation of a TSRF. (Author)

AD-272 852 Div. 30, 26
(TISTM/EJH) OTS price $12.00

American Machine and Foundry Co., Niles, Ill.
CONTAINER FAILURE DETECTION SYSTEM.
Interim technical engineering rept., 1 Nov 61-31 Jan 62,
by M. B. Levine, G. L. Schmitz, and
A. B. Wieczorek. 31 Jan 62, 1v. incl. illus. tables, refs.
(Contract AF 33(657)7461, Proj. 7-915)
(ASD TR 7-915, vol. 1) Unclassified report

DESCRIPTORS: (*Metal forming presses, *Extrusion, *Containers, Cylindrical bodies, Failure (Mechanics), *Non-destructive testing, Ultrasonics, Radiography, Surfaces, Electromagnetic fields, Magnetic fields, Electromagnetism, Feasibility studies.) *Bibliography.

Results of an initial feasibility study defining the in-press inspection of the billet containers of the Air Force Heavy Program, indicate that an inspection system is practicable. A system is recommended consisting of a combination of magnetic and ultrasonic techniques. The billet containers associated with the various presses in the Air Force Program are catagorized by dimensions, element thickness, construction, and accessibility. The past histories of container failures is examined in terms of frequency, location and cause. Application of this information to the results of a literature search and study of nondestructive test technique enables definition of the applicable inspection techniques and recommendation of a system capable of automated application. (Author)

AD-272 859 Div. 30, 12
(TISTP/TL) OTS price $3.60

Air Force Special Weapons Center, Kirtland Air Force Base, N. Mex.
A FORTRAN COMPUTER PROGRAM OF A KEPLERIAN TRAJECTORY,
by Carl S. Christensen and Allen D. Dayton.
Feb 62, 31p. incl. illus., 4 refs. (Rept. no. AFSWC TDR 62-19)
(Proj. 7811)
Unclassified report

DESCRIPTORS: (*Programming, *Computers, *Space probes, Booster rockets, *Orbital flight paths, Velocity.) (Geodesics, *Celestial mechanics, Time, Azimuth, Celestial navigation, Perturbation theory, Gravity.)

The classical two-body Keplerian orbit was programed in FORTRAN to give orbital elements, trajectory points, and look angles for various stations. All outputs are geodetic. The inputs can be the classical flight parameters or a velocity and position vector in a Cartesian coordinate system tangent to an oblate earth. The trajectory points are given as a function of time and they are geodetic altitude, geodetic latitude, longitude, inertial velocity, and flight path angle. The look angles are given in true azimuth, measured clockwise from north, and the elevation angle is measured upward from a tangent plane to a geodetic earth. (Author)

AD-272 987 Div. 30
(TISTP/MFA) OTS price $1.10

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
VACUUM TORSION MICROBALANCE,
by M. I. Driga. Mar 62, 7p. incl. illus. (Technical notes FRL-TN-58; Trans. from Izmeritel'naya Tekhnika 5:36-38, 1955)
Unclassified report

DESCRIPTORS: (Design of *Vacuum systems, *Torsion balances, Quartz, Wire, Elasticity, Magnets, Coils.) (*Instrumentation, Measurement.)

In working with a manometer for very low pressures, the necessity of measuring forces of the order of from 10 to 1/10 mg arose. An instrument based on the principle of the torsion balance was used for this purpose. A torsion balance with a quartz wire 25 microns in diameter was used; its error for suspending hanging weights of 10 mg and more does not exceed one percent. In making use of a torsion balance for measuring force, it should be kept in mind that the balance beam is not to be loaded with parts having significant weight. The torsion microbalance developed for the above purpose differs from those known through the literature on the subject in that instead of using the torque of the extremity of the wire, the magnetoelectric compensation of the torque of the load is used, and the value to be measured appears as the current strength in the compensating coil.

AD-272 999 Div. 30, 2
(TISTP/TL) OTS price $5.60

Texas A. and M. Coll., College Station.
INSTRUMENTATION AND DATA HANDLING SYSTEM FOR ENVIRONMENTAL STUDIES OFF PANAMA CITY, FLORIDA,
by Roy D. Gaul. 1 Feb 62, 6p. incl. illus. tables, 7 refs. (Ref. no. 62-1T)
(Contract Nonr-211904)
Unclassified report

DESCRIPTORS: (*Oceanography and *Meteorology, Data, *Instrumentation for Oceanographic data, Meteological data.) (Electronic equipment, Data transmission systems, Data storage systems, Power supplies, Telemetering systems, *Data processing systems.) (Wind, Barometric pressure, Ocean currents, Temperature.) (Transducers, Anemometers.) *Florida.

The scope of this report is limited to a summary of the instrumentation and data handling equipment procured and installed prior to February 1962 for environmental studies off Panama City, Florida. The project was initiated in May 1961 and most of the effort thus far has been expended on hardware. A two-man resident field party has been established to maintain and operate the equipment. (Author)

31. SHIPS AND MARINE EQUIPMENT

AD-272 587 Div. 31, 6
(TISTW/DLW) OTS price $1.60

Woods Hole Oceanographic Institution, Mass.
A LIGHT-WEIGHT TOWED TRANSDUCER ENCLOSURE FOR ECHO SOUNDING,
by S. T. Knott and W. E. Witzell.
Dec 61, 7p. illus. (Ref. no. 61-40)
(Contract Nonr-136700, Proj. NR 261-102)
Unclassified report

DESCRIPTORS: (*Transducers, *Towed bodies, *Containers, Housing, Packaging, Towing cables, Hoists, Shipborne, Load distribution, Stability, Design, Tests.) Echo ranging, *Sonar equipment.

The use of towed enclosures, commonly called fish, makes it practical for vessels without hull transducers to be readily equipped for bathymetric studies and enables those with hull transducers to place transducers deep enough to reduce noise and avoid quenching in heavy weather. A fish is described which is compact, light, can be towed from a variety of tow cables and is suitably stable when towed at a wide range of tow speeds. (Author)

AD-272 885 Div. 31, 12
(TISTW/JRG) OTS price $1.60

David Taylor Model Basin, Washington, D. C.
STERN AREA VIBRATION MEASUREMENTS ON USS OBSERVATION ISLAND (EAG 154),
by Richard L. Price. Jan 62, 15p. incl. illus. tables, 5 refs. (Rept. no. 1595)
Unclassified report

DESCRIPTORS: (*Naval vessels for Launching, *Guided missiles, *Ship hulls, Vibration, Tests.) (*Cargo ships, *Merchant vessels, Ship hulls, Vibration, Tests.)

In establishing hull vibration characteristics of the Mariner-Class hull, full-scale vibration trials were conducted on USS Observation Island (EAG 154). Vertical, athwartships, and fore-aft vibrations were measured at the stern under calm and rough-water conditions. The principal components of observed vibrations were at propeller blade (4th order) and double blade (8th order) frequencies. The principal hull mode frequencies observed on the EAG 154 are compared with previous theoretical and experimental results reported on SS Gopher Mariner, SS Old Colony Mariner, and USS Compass Island (EAG 153). Good correlation exists between the experimental results observed on the EAG 154 and the calculated natural frequencies. (Author)

AD-272 913 Div. 31, 5
(TISTW/RD) OTS price $5.60

Electric Boat Div., General Dynamics Corp., Groton, Conn.
SUBIC: SHIP CONTROL XIV ADVANCED FBM SUBMARINE SHIP CONTROL CONSOLE,
ed. by W. C. Blair and W. O. Henry. 15 Aug 61, 49p. incl. illus. table, 27 refs. (Rept. no. U411-61-102)
(Contract Nonr-251200)
Unclassified report

DESCRIPTORS: (Control, *Control systems in *Submarines carrying Underwater to surface, Guided missiles.) (Shipborne, Data processing systems, Digital systems.) (Reduction of Costs by Reduction of Submarine personnel.) *Display systems, *Combat information centers, Control panels, Shipborne, Human engineering.

An integrated ship control console is described which is designed so one man, under normal watchstanding conditions, can perform effectively all normal ship control operations; steering and diving, hovering, submerging and surfacing, trim and ballast control, missile compensation, and speed ordering control; and so, in emergency situations, an additional man can perform at an emergency helmsman's station. Three men now perform ship control operations in normal conditions, and a fourth man is required during an emergency situation. This integrated ship control console is designed for FBM submarines and is also generally compatible with the present requirements for ASW and attack submarines. (Author)

32. MISCELLANEOUS ARTS AND SCIENCES

AD-272 572 Div. 32, 15
(TISTP/WH) OTS price $8.60

Thompson Ramo Wooldridge, Inc., Los Angeles, Calif.
PROBABILISTIC INDEXING. A STATISTICAL TECHNIQUE FOR DOCUMENT IDENTIFICATION AND RETRIEVAL,
by M. E. Maron, J. L. Kuhns, and L. C. Ray. June 1959, 91p. incl. illus. tables (Technical memo. no. 3)
Unclassified report

DESCRIPTORS: (*Library science, *Applied mathematics, Probability, Statistical analysis, Topology, Algebraic topology, Algebra, Matrix algebra.) (*Documentation, *Indexes.) Computers.

This report describes recent experiments that were made to evaluate the retrieval effectiveness of a new method of literature indexing and searching entitled Probabilistic Indexing. In addition several refinements and extensions of the basic notions of Probabilistic Indexing are presented. (Author)

AD-272 820 Div. 32
(TISTB/LH) OTS price $5.60

Jonker Business Machines, Inc., Gaithersburg, Md.
OUTLINE OF A GENERAL THEORY OF INDEX TERMINOLOGY AND INDEXING METHODS,
by Frederick Jonker. Oct 61, 47p. incl. illus.
(Contract AF 49(638)961)
(AFOSR-1911) Unclassified report

DESCRIPTORS: (*Indexes, Theory, *Coding, *Classification, Documentation, *Library science, Language.) Data processing systems.

33. TRANSPORTATION

No Entries

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

*Descriptors marked with an asterisk are included in the subject index.

BIBLIOGRAPHY

Order from GPO $5.25 as D 1.22:10

Arctic Inst. of North America, Washington, D. C. ARCTIC BIBLIOGRAPHY, VOLUME X, ed. by Marie Tremaine. 1961, 1467p. 6570 refs.

DESCRIPTORS: *Bibliography, *Arctic regions, Geology, *Geophysics, Medicine, Minerals, Public health, Military medicine, Physiology, Ecology, Ionosphere, Ionospheric propagation, Radio waves, Propagation, Cosmic rays, Heat transfer, Ice.

Abstracts 56279-62848 arranged alphabetically by author; index.

TID-3096 $2.50

Atomic Energy Commission. Div. of Technical Information Extension, Oak Ridge, Tenn. PLUTONIUM, comp. by Richard J. Smith. A bibliography of selected rept. literature. July 61, 120p. 761 refs.

AGRICULTURE

TID-14316 $1.10

Purdue Research Foundation, Lafayette, Ind. TECHNICAL PROGRESS REPORT, for period 1 Feb-31 Oct 61, on Contract AT(11-1)-856. 13 Dec 61, 5p. 4 refs.

ASTRONOMY

Astrophysics

PB 156 259 $9.10

Australian National U., Canberra. AN ABSOLUTE ISOPHOTOMETRY OF THE SOUTHERN MILKY WAY AND TWO FIELDS IN ORION, by Hugh M. Johnson. Final rept. Volume III, on Contract Nonr-2746(00). May 60, 101p. 57 refs. Memoir no. 15, of the Mount Stromlo Observatory; AD-250 596.

DESCRIPTORS: *Photometers, *Galaxies, Astronomical cameras, Astronomy

The form and absolute brightness of the southern Milky Way are represented by means of isophotal charts in 3 passbands. One of the passbands is centered on H(α) and another near H(β) so that strong emissions of H II regions are selected; the third passes a yellow continuum serving as a standard nearly free of nebular emissions. The isophotal charts show 78 fields, each 11.5 degrees in diameter along 182 degrees of the Milky Way; the centers lie roughly 7 degrees apart on the galactic equator. Two more fields are centered on Orionis (Θ and λ). Each chart shows a field in 3 passbands centered near 6560A in the upper left, 4810A in the lower left, and 6070A on the middle right. The plates for the charts were taken with a 8-in. f/1 field flattened Schmidt camera; a tube sensitometer exposed spots on the margins of the plates. The isophotes were traced from enlargements of the plates, on a scale 1.05 times that of the published charts. A sample analysis is made of the H II region around Eta Carinea in order to show problems arising with the use of the charts.

PB 159 692 $2.60

Geophysical Inst., U. of Alaska, College. CATALOGUE OF HUET AURORAL SPECTRA 1957-1959, by Gerald J. Romick. Scientific rept. no. 1 on Contract Nonr-1289(00). Mar 61, 29p. UAG-R114; AD-254 934.

DESCRIPTORS: *Aurorae, Meteorological data, Experimental data, *Spectrographic data, *Spectrographic analysis, Diurnal variation, Arctic regions, Alaska.

The zenith auroral spectra at College, Alaska, obtained during the 1957-1959 observing seasons, is assembled in catalogue form. The prime purpose of the catalogue is to present the auroral activity in a manner which can be used by others in the interpretation of aurorally associated phenomena. From the general appearance of the spectra and other factors, a table of daily index numbers is given for two observing periods. Although these numbers should not be used in themselves as correlation data they are valuable as representative indices. This point is indicated by the clear appearance of the spring maximum in activity and a general yearly decline in activity towards the minimum of the sunspot cycle. (Author)

PB 159 675 $1.10

Yale [U.] Observatory, New Haven, Conn. SEARCH FOR POSSIBLE OPTICAL RADIATION CORRELATING WITH JUPITER'S NON-THERMAL RADIATION IN THE 20-MEGACYCLE REGION, by Harlan J. Smith. Final rept. on Office of Naval Research Grant Nonr-(G)-0002-60. 23 Mar 61, 6p. AD-254 008.

DESCRIPTORS: *Jupiter, *Stars, *Planets, Flares, Aurorae, Ions, Ionization.

The program originally envisaged was a search for optical emission (not merely reflection of sunlight) from Jupiter, the work to be done at three levels of improving sensitivity as Yale's instrumentation developed. A brief account of negative results from the first two observational attempts made during 1960 is presented. Much progress has been made toward the final instrumentation required for the program; this work is outlined, along with a major further development of the program in a direction not contemplated in the original proposal, namely the detection of stellar flares. (Author)

BEHAVIORAL SCIENCES

PB 159 732 $6.60

Washington U., Seattle.
THE LOGIC OF PERSONNEL SELECTION AND CLASSIFICATION, by Paul Horst. Rept. on Contract Nonr-477(08) and Public Health Research Grant M-743(C5). Mar 61, 70p. 10 refs. AD-254 557.

DESCRIPTORS: *Personnel, Selection, Classification, Automation

Contents: Some differences between man and machine. Functional characteristics; upper limits of performance; administrative factors. The nature of the personnel subsystem. The administrative organism; the mission; the jobs in the man subsystem; proficiency; selection procedures; personnel flow through; the man-machine system; training programs. The selection and classification model. The attributes; the entities of the selection model; the measures of the attributes; characteristics of measuring instruments; prevalidation administration; the criterion data; sample selection; kinds of prediction; predictor selection; prediction formulas.

Human Engineering

PB 159 800 $6.60

[Coordinated Science] Lab., U. of Illinois, Urbana.
HUMAN PERFORMANCE IN INFORMATION TRANSMISSION, PART I: GENERAL REMARKS. PART II: SEQUENTIAL TASKS (OVER-LEARNED ACTIVITIES), by Henry Quastler. Rept. on Contract DA 36-039-sc-56695. Mar 55, reprinted Feb 59, 69p. 42 refs. Rept. no. R-62.

DESCRIPTORS: *Information theory, Data, Transmission, *Human engineering, Engineering, Sequential analysis, Tests, Memory, Conditioned reflex, Reflexes.

The investigations described suggest some conclusions concerning human performance in information transmission in general. The points discussed concern methodology, the import of the estimates obtained, and the relation between the findings and possible mechanisms of human behavior.

PB 159 801

[Coordinated Science] Lab., U. of Illinois, Urbana.
NOTES ON THE ESTIMATION OF INFORMATION MEASURES, by Albert A. Blank and Henry Quastler. Rept. on Contract DA 36-039-sc-56695. May 54, 45p. 1 ref. Rept. no. R-56.

DESCRIPTORS: *Information theory, Data, Transmission, Processing, *Human engineering, Errors, Probability, Conditioned reflex, Reflexes, Memory.

Contents:
Information measures in incompletely known situations
Equivocation as the sum of error-locating and error-correcting information
Upper bounds for the equivocation
Remarks about the method of hints
A method of hints
The uncertainty measure for quantized normal distributions
Different methods compared

Psychology

PB 159 702 $1.60

Langley Porter Neuropsychiatric Inst., San Francisco, Calif.
STUDIES ON RELATIONSHIPS BETWEEN BRAIN WAVES AND BEHAVIOR, by Enoch Callaway III and Charles L. Yeager. Technical rept. on Contract Nonr-2931(00). 1 Mar 61, 16p. AD-252 296.

DESCRIPTORS: *Electroencephalography, *Behavior, Reaction (Psychology), *Visual perception, Stimulation, *Reaction time, Frequency analyzers.

An apparatus which presents stimuli to a person when his alpha activity is of a specified phase and amplitude was designed. Using this device, studies have been made on the relationships between human alpha activity and simple visual reaction time. Variations of alpha phase - reaction time relationships in single individuals over the course of time are illustrated. Comparisons of two analyzers are made. The Grey Walter analyzer functions in the frequency domain, and the Burch analyzer in the time domain. The correspondence in data between the resonant circuit and period systems of analysis is high in the alpha range, low in the delta and beta ranges, and negligible above 30 cycles per second. Each system gives specific data lost in the other system. (Author)

AD-267 662 Available on loan from OTS

New York U., N. Y.
FURTHER EXPERIMENTS ON IMMEDIATE RECALL OF WORD LISTS WITH THE REQUIREMENT TO MATCH LIST LENGTH IN RECALL, by Charles N. Cofer. Technical rept. no. 7 on Learning, Retention, and Recovery of Meaningful Material, Contract Nonr-285(47). July 61, 13p. 3 refs.

DESCRIPTORS: Verbal behavior, *Memory, *Vocabulary, Learning, Mathematical analysis, Experimental data, Tests, Errors.

AD-267 661 Available on loan only

New York U., N. Y.
INTER-ITEM ASSOCIATIVE STRENGTH AND IMMEDIATE FREE AND FORCED RECALL, by Charles N. Cofer. Technical rept. no. 1 on Learning, Retention, and Recovery of Meaningful Materials, Contract Nonr-285(47). Feb 61, 13p. 3 refs.

DESCRIPTORS: *Memory, *Vocabulary, *Verbal behavior, *Learning.

PB 159 674 $4.60

Northwestern U. [Evanston, Ill.]
THE EXPERIMENTAL INVESTIGATION OF CLINICAL JUDGMENT, by William A. Hunt and Nelson F. Jones (Colorado U. Medical Center). Rept. on Contract N7onr-450(11). [1961] 44p. 64 refs. AD-252 879.

DESCRIPTORS: *Medical personnel, *Reasoning, *Behavior, Psychiatry, Psychology, Personality, Probability, Reliability, Effectiveness, Test methods, Theory, Quantitative analysis.

Contents:
Basic issues in the experimental investigation of clinical judgment
The analogical approach
The psychophysical model - stimulus identification
The judgmental situation
Categories of report

PB 159 736 $8.10

Personnel Research Board, Ohio State U., Columbus.
ORIGINALITY IN GROUP PRODUCTIVITY. III. PARTISAN COMMITMENT AND PRODUCTIVE INDEPENDENCE IN A COLLECTIVE BARGAINING SITUATION, by Richard J. Campbell. Rept. on Contract Nonr-495(15). Dec 60, 81p. 59 refs. AD-252 390.

DESCRIPTORS: *Group dynamics, *Behavior, *Reasoning, *Industrial relations, Production, Test methods, Statistical analysis, Theory, Management engineering.

This study was concerned with a specific type of group decision-making, the collective bargaining conference. It was designed to study the effects of team composition and bargaining costs on the two major outcomes of bargaining conferences. (1) the quality of the solutions or standards produced; and (2) the speed with which these standards are reached. The experimental task consisted of the negotiation of nine issues of a labor contract by two teams of negotiators. Background information given to the negotiators provided them with a frame of reference with which to compare the issues under discussion and permitted objective measurement of quality of solution. Eighteen four-man groups performed on the experimental task. Subjects were assigned to experimental groups on the basis of their scores on a screening questionnaire designed to measure identification with the labor or the management group. (Author) (See also PB 157 396)

PB 159 783 $1.60

Research Center for Human Relations, New York U., N. Y.
EFFECTS OF VARIATIONS IN ASSERTIVENESS OF NEGROES ON INTERACTION WITH WHITES, by Irwin Katz and Melvin Cohen. Technical rept. no. 3 on Contract Nonr-285(24). [1960] 20p. 4 refs. AD-254 476.

DESCRIPTORS: *Group dynamics, Labor, *Behavior, *Reasoning.

Biracial dyads, composed of Negro and white Northern college students, engaged in cooperative problem solving. Unknown to them, subjects (Ss) received different information, so that only one could solve any problem. Each S had the solvable version half the time. Correct solutions were announced after each team decision. Under assertion training the partner with the easy version was made to propose the correct answer with high expressed confidence. Under no training the person having the easy version was not forced to propose the correct solution. Pre and post measures of social influence were obtained on another task. Also, social perceptions were studied. It was predicted that Negro influence would increase in assertion training and decrease in no training, and that the relation between movement of Negroes' private judgments toward the partner's judgments, on the one hand, and the partner's previous accuracy, would increase in assertion training and decrease in no training. The first three predictions were upheld by the data, while the last was not testable. Some other findings were: Negroes tended to make accurate comparisons of their own and their partner's ability and influence; whites in assertion training downgraded the partner's ability, and tended to reject him as a future co-worker. The last two findings suggest that the confident show of ability by Negroes in assertion training was ego-threatening to whites. (Author)

AD-255 570 $1.60

Yale U. [New Haven, Conn.]
STRUCTURAL FACTORS IN THE ACCEPTANCE OF IMBALANCE-REDUCING COMMUNICATIONS, by Milton J. Rosenberg and Robert P. Abelson. Technical rept. no. 3, on Contract Nonr-609(27). 1960, 20p. 8 refs.

DESCRIPTORS: *Attitudes, Social communication, Statistical analysis, *Perception, Reaction (Psychology).

Some aspects were studied of the sequence in which a person thinks his way through to the achievement of an altered cognition or set of cognitions. The general conclusion seemed to be that imbalance reduction within a structure of attitudinal cognitions will tend to follow a least effortful path. If only a single sign change

is required, the receptivity to a communication advocating that change is relatively great. As between those communications implying 2 sign changes vs. those implying 3, there is less difference, though the least-effort principle is still strongly supported. Since the change communications are concerned directly only with the 3 relations between concepts, the subjects may have felt more hesitant at the prospect of changing their direct evaluations of the concepts than would have otherwise been the case. To this line of argument it may be countered that the subjects were specifically instructed to feel free to change both concept evaluations and perceived relations as they thought through the import of the communications. (ASTIA abstract)

AD-255 571 $1.60

Yale U. [New Haven, Conn.]
STRUCTURAL REORGANIZATION FOLLOWING ACCEPTANCE OF IMBALANCE-REDUCING COMMUNICATIONS, by Milton J. Rosenberg and Robert P. Abelson. Technical rept. no. 4, on Contract Nonr-609(27). 1960, 17p. 6 refs.

DESCRIPTORS: *Attitudes, Social communication, Statistical analysis, *Perception, Tests, Group dynamics, Reaction (Psychology).

The present experiment was undertaken to replicate the previous study (AD-255 570) and to investigate the influence of structural factors upon the further cognitive consequences of accepting a communication that enables a "least effortful" restoration of formal structural balance. (Author)

BIOLOGICAL SCIENCES

TID-14372 $1.10

Johns Hopkins U., Baltimore, Md.
STUDIES ON BIOLUMINESCENCE AND ENERGY TRANSFER MECHANISMS, by W. D. McElroy. Rept. on Contract AT(30-1)-2514. 21 Nov 61, 6p. 7 refs.

PB 159 677 $1.10

[New York State Coll. of Agriculture, Cornell U., Ithaca.]
DIETARY AND OTHER FACTORS CONCERNED IN MOUTH AND TOOTH DETERIORATION, by Clive M. McCay. Final rept. [on Contract Nonr-401(24)]. 22 Mar 61, 10p. 1 ref. AD-253 769.

DESCRIPTORS: *Mouth, *Teeth, *Diet, Hamsters, Arthritis, Laboratory animals, Metabolism.

A large experiment to study the effect of diet and various additives on the hamster, especially with regard to the incidence of arthritis and the condition of teeth and bones, was begun in 1957. We know that the male hamster outlives the female; the fluorine content of the drinking water of 0, 1 ppm or 10 ppm produced no effects on teeth; the Hoppert diets were the best of those used; the Hoppert diet with niacinamide was one of the best; the diets with cod liver oil and milk supplements were good; the poorest diets were those containing sugar; and liver and heart pathology seem more important in the hamster than in the rat.

ORO-480 $1.60

Tennessee U., Knoxville.
INVESTIGATIONS CONCERNING THE TOXICITY AND PHARMACOLOGY OF YTTRIUM. Rept. on Contract AT(40-1)(2625). 15 Oct 61, 12p.

Botany

TID-14371 $1.10

Connecticut U., Storrs
ION INTERACTIONS IN PLANT TISSUES. Progress rept. Jan 61-Jan 62, on Contract AT(30-1)-2117. Mar 62, 8p.

PB 159 693 $1.60

New York State Coll. of Agriculture, Cornell U., Ithaca.
A METHOD FOR ESTIMATING COMBINING ABILITY COMPONENTS OF VARIANCE IN INCOMPLETE BLOCK DESIGNS, by Walter T. Federer and Robert L. Plaisted. Technical rept. no. 4. on Contract Nonr-401(39). [1961] 16p. 6 refs. AD-251 724.

DESCRIPTORS: *Plants, Potatoes, Rearing, *Genetics, Mathematical prediction, *Analysis of variance.

A method is described for estimating components of variance for specific and general combining ability from breeding experiments arranged in incomplete block designs. Utilizing published results, estimates of these components of variances were computed for a potato breeding experiment arranged in a rectangular lattice design with the parameters v = 200 entries, k = 20 entries per incomplete block, r = 6 complete blocks, and b/r = 20 incomplete blocks within each complete block. The experiment was grown at three different locations thus yielding three estimates of the components of variance for combining ability. These results were used in the computations of expected genetic progress in a preceding paper. The algebraic results were arranged in table form to facilitate printing. (Author)

General Biology

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Army Research Office, Washington, D. C.
ARMY RESEARCH TASK SUMMARY, FISCAL YEAR 1961. VOLUME 1. LIFE SCIENCES AND PSYCHOLOGICAL AND SOCIAL SCIENCES. 473p.

DESCRIPTORS: *Biology, Microbiology, Biochemistry, Biophysics, Immunology, Pharmacology, Radiobiology, Neuropsychiatry, Physiology, Metabolism, Animals, Plants, Dentistry, Preventive medicine, Surgery, *Psychology, *Social sciences, Anthropology, *Military research, *Medical research.

Contents:
Life sciences
Study & investigation
Microbiology
Biochemistry
Biophysics
Immunology
Pharmacology
Radiobiology
Neuropsychiatry
Physiology
Metabolism
Zoological sciences
Plant sciences
Dentistry
Internal medicine
Preventive medicine
Surgery
Psychological & social sciences
Psychology
Psychophysiology
Anthropology & ethnology
(See also PB 171 000)

PB 159 691 $18.00

Coastal Studies Inst., Louisiana State U., Baton Rouge.
LOUISIANA COASTAL MARSH ECOLOGY, by Willis A. Eggler, Anthony Ekker and others. Technical rept. no. 14, on Contract Nonr-1575(03). 1 Mar 61, 285p. 31 refs. Contribution no. 61-2; AD-252 978.

DESCRIPTORS: *Ecology, *Louisiana, Sewage, Bacteria, Biology, Marine biology, Sanitary engineering, *Swamps.

Contents:
Vegetation of the drainage basin of Grand Bayou Blue
Evaluation of biological conditions for winter months
Chemical and bacteriological survey
Chemical investigations from four selected stations
Appendix: Evaluation of procedures employed in collecting chemical data
Bacteriological investigations
Chemical survey of waters and muds
Ecological studies in Timbalier Bay

Radiobiology

ANL-6464 $2.75

Argonne National Lab., Ill.
BIOLOGICAL AND MEDICAL RESEARCH DIVISION. Semi-annual rept. Jan-June 61, on Contract W-31-109-eng-38. Nov 61, 166p. 68 refs.

TID-14284 $1.10

Chile U., Santiago.
AN IMMUNOGENETIC STUDY OF THE MECHANISMS OF PROTECTION AGAINST RADIATION DEATH BY TREATMENT WITH HEMOPOIETIC TISSUES, by Gustavo Hoecker. Progress rept. on Contract AT(30-1)-2488. 22 Sep 61, 6p. 6 refs.

TID-14093 $1.60

Marquette U. School of Medicine, Milwaukee, Wis.
RELATION OF RICKETTSIAL AND VIRAL INFECTIONS TO RADIATION INJURY AND FREEZE-DRYING OF CELLULAR PARTICULATES. Progress rept. 1 Jan-15 Sep 61, on Contract AT(11-1)-596. 3 Nov 61, 15p.

TID-13328 $10.50

Massachusetts Inst. of Tech., Cambridge.
RADIUM AND MESOTHORIUM POISONING AND DOSIMETRY AND INSTRUMENTATION TECHNIQUES IN APPLIED RADIOACTIVITY. Annual progress rept. on Contract AT(30-1)-952. May 61, 138p. 21 refs.

TID-14212 $1.10

New Hampshire U., Durham
RADIATION INDUCED VIABILITY MUTATIONS IN THE HONEY BEE, William R. Lee. Rept. on Contract AT(30-1)-2315. Feb 61, 6p. 10 refs.

TID-14100 $1.60

Northwestern U., Evanston, Ill. Medical School, Chicago.
INVESTIGATION OF THE NATURE AND FORMATION OF HYALINE SUBSTANCE. Final rept. 1 Nov 59-31 Oct 61, on Contract AT(11-1)-809. 19p. 9 refs.

NYO-2631 $3.00

Nuclear Science and Engineering Corp., Pittsburgh, Pa.
EXPLORING RADIOISOTOPE APPLICATIONS IN THE PHARMACEUTICAL AND ALLIED INDUSTRIES, by Robert L. Bogner, Alfred P. Intoccia and others. Rept. on Contract AT(30-1)-2359. Nov 61, 227p. 75 refs.

ORNL-3172 $2.50

Oak Ridge National Lab., Tenn.
USE OF ANALOG COMPUTERS FOR SIMULATING THE MOVEMENT OF ISOTOPES IN ECOLOGICAL SYSTEMS, by R. B. Neel and J. S. Olson. Rept. on Contract W-7405-eng-26. Mar 62, 119p. 21 refs.

UR-604 $3.60

Rochester U. School of Medicine and Dentistry, N. Y.
HIGH SPECIFIC ACTIVITY LABELING OF PROTEIN WITH I^{131}, by William F. Bale, Ralph W. Helmkamp and others. Rept. on Contract W-7401-eng-49. 8 Jan 62, 37p. 12 refs.

TID-13911 $1.60

Roscoe B. Jackson Memorial Lab., Bar Harbor, Maine
RATE OF RECOVERY FROM RADIATION INJURY AND ITS RELATIONSHIP TO AFTER EXPECTATION OF LIFE IN MICE, by John B. Storer. Progress rept. on Contract AT(30-1)-2313. 20 Sep 61, 14p.

CHEMISTRY

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Army Research Office, Washington, D. C.
ARMY RESEARCH TASK SUMMARY, FISCAL YEAR 1961. VOLUME 2. CHEMISTRY. 401p.

DESCRIPTORS: *Chemistry, Chemical analysis, Inorganic substances, Organic compounds, Physical chemistry, Colloids, Radiochemistry, Nuclear physics, *Military research.

Contents:
Analytical chemistry
Inorganic chemistry
Organic chemistry
Physical chemistry, colloids
Physical chemistry, general and nuclear
(See also PB 171 001)

PB 159 797 $4.60

Material Lab., New York Naval Shipyard, Brooklyn.
SURVEY OF THE TECHNICAL LITERATURE ON THE SYNTHESIS AND PROPERTIES OF METALLO-ORGANIC POLYMERS, by A. B. Delman. Progress rept. 1. 12 June 59, 48p. 179 refs. Lab. Project 6135; AD-225 176.

DESCRIPTORS: *Metalorganic compounds, Polymerization, *Polymers, *Bibliography, Silicones.

Contents:
Polymers related to the silicones (58 refs)
Polymers not related to the silicones (121 refs)

Analytical Chemistry

NLCO-836 $1.50

National Lead Co. of Ohio, Cincinnati.
HYDROGEN IN URANIUM, by F. E. Jenkins and T. J. Keefe. Rept. on Contract AT(30-1)-1156. 15 Mar 62, 58p. 49 refs.

ORNL-3243 $2.50

Oak Ridge National Lab., Tenn.
ANALYTICAL CHEMISTRY DIVISION. Annual progress rept. for period ending 31 Dec 61, on Contract W-7405-eng-26. 128p.

ORNL-3241 $0.50

Oak Ridge National Lab., Tenn.
THE CHEMISTRY OF NIOBIUM IN PROCESSING OF NUCLEAR FUELS, by T. A. Gens. Rept. on Contract W-7405-eng-26. Mar 62. 16p. 57 refs.

Inorganic Chemistry

IS-386 $2.50

Ames Lab., Iowa State U. [of Science and Tech.]
THE MASS SPECTRA OF SOME VOLATILE HYDRIDES, by Fred Eric Saalfeld and Harry J. Svec. Rept. on Contract W-7405-eng-82. Nov 61, 122p. 65 refs.

GAT-T-552(Rev. 1) $1.10

Goodyear Atomic Corp., Portsmouth, Ohio.
REACTIONS OF MOLYBDENUM, TUNGSTEN, AND URANIUM HEXAFLUORIDES WITH NITROGEN COMPOUNDS. I. NITROUS AND NITRIC OXIDES, by P. R. Ogle, J. R. Geichman, and S. S. Trond. Rept. on Contract AT(33-2)-1. 16 Feb 59, declassified 11 Dec 61, 5p.

TID-14361 $1.60

New Hampshire U., Durham.
REACTIONS IN NON-AQUEOUS SOLVENTS, by Helmut M. Haendler. Progress rept. 1 Oct 60-31 Oct 61, on Contract AT(30-1)-1964. 1 Nov 61, 16p. 1 ref.

Organic Chemistry

AD-259 460 $1.10

Florida State U., Tallahassee.
[SALT-INDUCED MEDIUM EFFECTS] by Ernest Grunwald. Final rept. on Contract Nonr 98802. 30 June 61, 5p. 19 refs.

DESCRIPTORS: Water, *Organic solvents, *Solutions, *Solvent action, *Electrolytes, Dissociation, *Colloids, Solubility, Ions, Salts, Solvates, Ionization, Ethylenes, Organic acids, Carboxylic acids, Methanols, Chemical indicators, Dyes, Detergents, Phenyl radicals, Methanes.

Research activities are summarized for the following: (1) solvation of electrolytes in partially aqueous organic solvents; (2) salt-induced medium effect in dioxane-water mixtures; (3) acid dissociation constants and related problems in methanol-water mixtures; (4) organic reactions occurring in or on micelles. Literature references pertaining to this research are cited.

PB 159 701 $1.10

Florida U., Gainesville.
THE SYNTHESIS OF UNSATURATED FLUOROCARBONS, by Paul Tarrant, David E. O'Connor, and Frank J. Pisacane. Quarterly rept. no. 39, 13 Dec 60-13 Mar 61, on Contract DA 19-129-QM-500, continuation of Contracts DA 44-109-QM-(552-1469). Mar 61, 10p.

DESCRITPORS: *Fluorocarbons, Organic compounds, Synthesis, Ethylenes, Chlorides, Fluorides, Nitrogen compounds, Oxychlorides, Chemical reactions, Methyl radicals, Sulfoxides, Amides, Organic solvents, Aluminum compounds, Iron compounds, Chlorides, Catalysts, Catalysis, Butenes, Butadienes, Dienes, Diels-Alder reactions, *Elastomers, Materials.

Optimum conditions ($AlCl_3$ as catalyst and dimethyl formamide as solvent) were derived for the formation of $CF_2ClCFClNO$ (56%) from $CF_2=CFCl$ and NOCl. NOCl underwent little or no reaction with $CCl_2=CCl_2$, $CCl_2=CHCl$ or $CF_3CCl=CClCF_3$. $Hg(CF_3CHF)_2$ was prepared from $CF_2=CFH$ and HgF_2 which with NOCl gave a nitroso compound (14%). Butadiene and 2,3-dimethylbutadiene with $CF_2ClCFClNO$ gave Diels-Alder adducts tentatively identified as $CF_2ClCFClNOCH_2CH=CHCH_2$ and $CF_2ClCFClNOCH_2C(CH_3)=C(CH_3)-CH_2$. (Author)

UCRL-9832 $1.10

Lawrence Radiation Lab., U. of California, Berkeley.
THE REACTION OF ALDOXIMES WITH ALKALI, by Henry Rapoport and William Nilsson. Rept. on Contract W-7405-eng-48. Aug 61, 8p. 1 ref.

Physical Chemistry

IS-286 $1.75

Ames Lab., Iowa U. of Science and Tech.
SEPARATION OF VARIOUS COMPONENTS FROM URANIUM BY OXIDATION-REDUCTION REACTIONS IN A LIQUID KCl-LiCl/Zinc SYSTEM, by Premo Chiotti and Sidney J. S. Parry. Rept. on Contract W-7405-eng-82. 10 Apr 61, 66p. 19 refs.

IS-300 $1.75

Ames Lab., Iowa State U. [of Science and Tech.]
SOME PHYSICAL AND CHEMICAL PROPERTIES OF SCANDIUM AND THE RARE EARTHS, by Maynard Allyn Hiller and J. E. Powell. Rept. on Contract W-7405-eng-82. July 59, 68p. 155 refs.

NAA-SR-6518 $1.10

Atomics International, Canoga Park, Calif.
HEAT CONTENTS, $H_T-H_{298.1°K}$, FOR SOME HALIDES OF MERCURY, CADMIUM, AND BISMUTH AND THEIR MELTING POINTS, by L. E. Topol and L. D. Ransom. Rept. on Contract AT(11-1)-GEN-8. 30 Dec 61, 3p. 5 refs.

PB 159 683 $2.60

Calvin Coll., Grand Rapids, Mich.
THE AgO-Ag_2O ELECTRODE IN ALKALINE SOLUTION, by Thedford P. Dirkse. Technical rept. no. 12 on Contract Nonr-1682(01). 1 Mar 61, 21p. 17 refs. AD-253 663.

DESCRIPTORS: *Silver electrodes, Hydroxides, Silver compounds, Potassium compounds, Thermodynamics, Hydrogen electrodes, Oxides, Determination, Measurement, Electrochemistry, Solutions, *Electric potential, *Electrodes

An attempt has been made to evaluate the standard potential of the $AgO/Ag_2O/OH^-$) electrode by direct measurement against a hydrogen electrode. The value obtained is 0.599 + or - 0.001 volt at 25 C. However, the value appears to vary with KOH concentration. Furthermore, dE/dT values appear to change with KOH concentration and with temperature. It is concluded that the electrode potential for this electrode system has been measured. The results obtained seem to be associated with an Ag_2O-solution interface rather than with an AgO-Ag_2O couple. (Author)

PB 159 738 $3.60

Frick Chemical Lab., Princeton U., N. J.
THE STRUCTURE OF THE DISCONTINUITY IN DETONATION WAVES, by B. Levitt and D. F. Hornig. Technical rept. no. 2, on Contract Nonr-1858(24). 15 Mar 61, 33p. 18 refs. AD-254 643.

DESCRIPTORS: *Detonation waves, Reflection, *Shock waves, Refractive index, Relaxation time, Fluid mechanics, Gases, Hydrogen, Oxygen, Physical chemistry, *Optics, Light.

The optical reflectivity technique was used to study the structure of the initial discontinuity in detonation waves in $H_2 : 3O_2$ at initial pressures of 20 to 40 psia. The detonation fronts were found to be comparable to normal shock waves in their thickness and planarity. The density change across the front appeared less than the theoretical value, suggesting that rotational relaxation of oxygen (and hydrogen) in the front may not be complete. Experiments on shock waves in oxygen at Mach 3.0, where the final temperature is 872 K, confirm the rotational heat capacity lag and suggest that rotational relaxation is much slower at high temperatures than at room temperature. (Author)

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I 19.13:1496-B

Geological Survey, Washington, D. C.
COPPER-SPARK METHOD FOR SPECTROCHEMICAL DETERMINATION OF STRONTIUM IN WATER. CHEMISTRY OF STRONTIUM IN NATURAL WATER, by Marvin W. Skougstad. 1961, 13p. 7 refs. Geological Survey Water-Supply paper 1496-B.

DESCRIPTORS: *Strontium, *Water, *Spectrographic analysis, Sampling, Recovery, Solutions, *Copper electrodes, *Sparks.

This is a rapid, reliable procedure which utilizes the copper-spark technique and an internal standard-buffer solution added in constant amount to each sample. The choice of lanthanum as an internal standard and the three convenient analytical line pairs, Sr:4077.7/La:4077.3, Sr:4077.7/La:3949.1, and Sr:4215.5/La:3949.1, permit the determination of strontium from 0.005 to 1.0 ppm (parts per million) in water. Twenty-five milliliters of sample is sufficient and sample preparation is simplified so that a relatively large number of samples can be conveniently and economically handled. This procedure is particularly suited to the determination of strontium in natural waters at concentration levels of less than 1.0 ppm. Although the procedure was used only for the determination of strontium, it could be used for the determination of other elements.

TID-14328 $3.60

Indiana U., Bloomington.
ELECTROCHEMISTRY IN ANHYDROUS ETHYLENEDIAMINE. EFFECTS OF SALTS AND SOLVENT IN POTENTIOMETRY AND POLAROGRAPHY, by Ward B. Schaap, Richard E. Bayer and others. Mar 62, 35p. 34 refs.

TID-14370 $5.60

Institute for the Study of Rate Processes, U. of Utah, Salt Lake, City.
SURFACE CHEMISTRY PHENOMENA. PART I. HYDROGEN IN NICKEL. PART II. ELECTRODE DEPOLARIZATION KINETICS ON OPEN CIRCUIT. PART III. CATALYTIC POISONING OF A SMOOTH PLATINUM CATHODE. PART IV. TRANSIENT ELECTRODE POTENTIALS AND INTERFACIAL CAPACITIES OF NICKEL AND LEAD. PART V. CORROSION OF METALS IN FUSED SALT SYSTEMS, by Vernon LeFebre, Carl J. Christensen and others. Progress rept. on Contract AT(11-1)-82. 31 Oct 61, 52p. 6 refs.

UCRL-6652 $0.75

Lawrence Radiation Lab., U. of California, Livermore.
GETTERING OF RESIDUAL GASES AND THE ADSORPTION RATE OF HYDROGEN ON EVAPORATED MOLYBDENUM FILMS AT LIQUID NITROGEN TEMPERATURES, by Angus L. Hunt, Charles C. Damm, and Earl C. Popp. Rept. on Contract W-7405-eng-48. 18 Dec 61, 27p. 7 refs.

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C 13.4: 510/supp. 2

National Bureau of Standards, Washington, D. C.
ALPHABETICAL INDEX TO TABLES OF CHEMICAL KINETICS, HOMOGENEOUS REACTIONS. 5 Aug 60, 37p. Supplement 2 to NBS Circular 510.

DESCRIPTORS: *Homogeneous reactions, Chemical reactions, Reaction kinetics, *Tables, *Indexes.

Order from GPO $4.00 as
C 13.4:510

National Bureau of Standards, Washington, D. C.
TABLES OF CHEMICAL KINETICS, HOMOGENEOUS REACTIONS. 28 Sep 51, 731p. NBS Circular 510.

DESCRIPTORS: *Homogeneous reactions, Chemical reactions, Reaction, Kinetics, *Tables.

Contents:
Subject index
Alphabetical index
Code abbreviations for periodicals
Introduction
Tables

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C 13.4:510/supp. 1

National Bureau of Standards, Washington, D. C.
TABLES OF CHEMICAL KINETICS, HOMOGENEOUS REACTIONS. 14 Nov 56, 472p. Supplement 1 to NBS Circular 510.

DESCRIPTORS: *Homogeneous reactions, Chemical reactions, Reaction kinetics, *Tables.

Order from GPO $2.75 as
C 13.11:34

National Bureau of Standards, Washington, D. C.
TABLES OF CHEMICAL KINETICS, HOMOGENEOUS REACTIONS (SUPPLEMENTARY TABLES). 15 Sep 61, 454p. NBS Monograph 34.

DESCRIPTORS: *Homogeneous reactions, Chemical reactions, Reaction kinetics, *Tables.

PB 159 681 $1.10

Polytechnic Inst. of Brooklyn, N. Y.
FUNDAMENTAL STUDY OF ELECTRODE PROCESSES AND RELATED PROBLEMS, by R. A. Marcus. Technical rept. no. 4 (Final) on Contract Nonr-839(22). 15 Mar 61, 6p. 7 refs. AD-253 491.

DESCRIPTORS: Schlieren photography, Theory, *Electrochemistry, *Electrodes, Electrons, *Solvent action, Ultraviolet radiation, Molecular structure, *Electrolytic cells, Polarization.

A theoretical investigation was made on fundamental aspects of the mechanism of electrochemical reactions involving electron transfer. The statistical mechanical basis of electron transfer theory was examined and the theory was generalized to include the effect of differences in correspondihg bond lengths in the two redox forms of the electrochemically active species on the reaction rate. Various electrochemical data on simple electron transfer systems were analyzed in terms of the electron transfer theory, and the relation to chemical electron transfers was discussed. An experimental investigation was made of the effect of visible and UV light on the current-potential behavior of a simple electrochemical system,the iodine-iodide half-cell. The effects of light intensity, wavelength, concentration of reactants, temperature, distance between electrode and incident optical window, and current were investigated. The stability of electron pairs in polar solvents was examined, and the effect of polar solvents on the electronic structure and absorption spectrum of highly polarizable conjugated molecules was studied. (Author)

DP-621 $0.50

Savannah River Lab., Aiken, S. C.
THE STABILITY OF PuF_3 IN THE TRIFLUORIDE PRECIPITATION PROCESS, by J. A. Porter. Rept. on Contract AT(07-2)-1. Aug 61, 11p. 3 refs.

AD-269 013 $1.10

Stanley-Thompson Lab., Columbia U , New York.
THE EFFECT OF SOLVENTS ON THE PROPERTIES OF SPREAD MONOLAYERS, by Jack H. Schulman, Israel R. Miller, and Leonard Nanis. Rept. on Contract Nonr-266(64). 13 Dec 61, 8p. 5 refs.

DESCRIPTORS: *Organic solvents, Surfaces, *Films, *Molecules, Diffusion, Vaporization, Solubility, Solutions, Water, *Benzenes, Theory, Mathematical analysis.

A model is proposed as an initial step in the solution of the overall problem and provides an estimate for the maximum time required for solvent evaporation. No special assumption regarding diffusion along a constant gradient is necessary. Diffusion as the rate-controlling step in the vapor side is not neglected. In this model, the first step consists of the disappearance of the spread solvent layer. Upon termination of this process, back diffusion of the solvent from the aqueous phase into the vapor phase proceeds and may be considered a discrete process. A concentration of solvent which is a slowly decreasing function of time is maintained in the layer adjacent to the surface. The concentration in the surface is controlled by the distribution coefficient of the solvent between the layer of the aqueous phase adjacent to the surface and the surface phase. This distribution coefficient is a criterion for the selection of a spreading solvent in that a good solvent should not tend to accumulate in the surface.

EARTH SCIENCES

Climatology and Meteorology

PB 159 737 $3.60

American Geographical Society, New York.
AMERICAN GEOGRAPHICAL SOCIETY SOUTHERN CHILE EXPEDITION 1959, by Calvin J. Heusser. Final rept. on Contract Nonr-641(04). Mar 61, 32p. 75 refs. AD-254 224.

DESCRIPTORS: *Chile, Geography, *Climate, South America, North America, Northern hemisphere, Southern hemisphere, Arctic regions, Antarctic regions.

Contents;
Laguna de San Rafael
  Location and regional setting
  Climate
  Vegetation
  Postglacial environments
The problem of correlation
Climatic changes in northwestern North America
Climatic changes in Patagonia and related areas in South America and the southern hemisphere
Regarding polar hemisphere correlations

MND-SR-2615 $3.00

Martin Co., Baltimore, Md.
DATA TELEMETRY PACKAGE POWERED BY STRONTIUM-90 FUELED GENERATOR. Final rept. on Contract AT(30-1)-2519. 201p. 15 refs.

PB 159 698 $2.60

Woods Hole Oceanographic Institution, Mass.
THE AIRBORNE MICROWAVE REFRACTOMETER DEVELOPED AS AN HYGROMETER, by Andrew F. Bunker. Technical rept. no. 45 on Marine Meteorology, Contract Nonr-1721(00). Mar 61, 22p. 5 refs. Ref. no. 61-13; AD-254 284.

DESCRIPTORS: *Meteorology, *Refractometers, *Hygrometers, Instrumentation, Water vapor, *Air mass analysis, Experimental data, Airborne.

A resonant-cavity microwave refractometer equipped with temperature and pressure compensating elements was installed and flown in a research airplane. Signals from the compensated output of the refractometer were equal to the water vapor density or, if divided by the air density, to the specific humidity of the air. These signals were recorded on a photographic oscillograph. The system yielded rapid fluctuations of the vapor when combined with simultaneous observations of the turbulent vertical velocities of the air. Sample of records obtained are presented and discussed.

Geodesy

Order from GPO $1.75 as
C 4.19/2:65-1/pt. 49

Coast and Geodetic Survey, Washington, D. C.
PLANE COORDINATE INTERSECTION TABLES (2 1/2-MINUTE) ALASKA ZONE 1. 1961, 297p. Publication 65-1, part 49.

DESCRIPTORS: Geodesics, *Geodetic data, *Alaska, *Tables, Mapping, Azimuth, Corrections, Ellipsoids, Numerical analysis.

Using the 2 1/2-minute values listed and the interpolation formulas suggested, it is possible to compute, with relative ease, the plane coordinates of any arbitrary point in the zone from the given geodetic coordinates, as well as to solve the inverse problem of obtaining geodetic coordinates from given plane coordinates. The tabulations of the necessary functions for this type of projection would be so extensive as to make the direct method of computation impractical. The method of interpolation is not only shorter but as accurate as direct computation would be with a ten-bank calculator, when the second-difference corrections listed on each page are applied.

AD-257 200 $6.60

Electrical Engineering Research Lab., U. Texas, Austin.
INSTRUMENTATION AND TECHNIQUES FOR SIMULTANEOUS MEASUREMENT AND SYNCHRONOUS TRANSCRIPTION OF TELLURICS, by Franklin U. Williams and George H. Hopkins, Jr. Rept. on Contract Nonr-375(01). 31 May 61, 66p. 6 refs. Rept. no. 123.

DESCRIPTORS: *Terrestrial magnetism, *Earth, *Electric fields, Measurement, Recording devices, Magnetic tape, *Data transmission systems, Mobile, Texas, Instrumentation

A program was undertaken to measure and analyze the variations of the telluric fields for a particular band of frequencies. The term "telluric field" is restricted to the variations with periods of several minutes or less that occur in the earth's electric field. An experimental project was initiated to measure and record the variations simultaneously at two sites. Later, these recorded data are synchronously transcribed onto one magnetic tape in preparation for analysis. This report describes the instrumentation of the mobile measuring system, the transcription system, and the operational techniques that are used to make the measurements and transcriptions. (Author)

Geology

UCRL-13030 $9.60

Colorado School of Mines Research Foundation, Inc., Golden.
SOURCES OF INFORMATION ON ROCK PHYSICS, by Lorraine Burgin. Current literature, Nov 61. 118p.

UCRL-13031 $6.60

Colorado School of Mines Research Foundation, Inc., Golden.
SOURCES OF INFORMATION ON ROCK PHYSICS, by Lorraine Burgin. Current literature, Dec 61. 64p.

Order from GPO $1.00 as
I 19.3:1112-E

Geological Survey, Washington, D. C.
COAL RESOURCES OF THE TRINIDAD COAL FIELD IN HUERFANO AND LAS ANIMAS COUNTIES, COLORADO. CONTRIBUTIONS TO ECONOMIC GEOLOGY, by Ross B. Johnson. 1961, 51p. 86 refs. Geological Survey bulletin 1112-E.

DESCRIPTORS: Economics, *Geology, Geological survey, *Colorado, *Coal, Rock, Sedimentation, Geography.

The Trinidad coal field underlies an area of about 1,100 square miles in Huerfano and Las Animas Counties, south-central Colorado, and extends from the Colorado-New Mexico boundary northward almost to the Huerfano River. Its western margin is the eastern front of the Sangre de Cristo Mountains, and its eastern margin extends to longitude 104°30' West. The coal field is largely a highly dissected upland area in the westernmost part of the Great Plains province, and the coal occurs in rocks limited to the structural trough of the Raton basin. Beds of coal occur throughout the Vermejo and Raton formations, and thin beds of coal occur locally in the lowermost beds of the Poison Canyon formation. The beds of coal differ in thickness and in purity.

Order from GPO $0.15 as
I 19.13:1544-A

Geological Survey, Washington, D. C.
FILTER-PRESS METHOD OF EXTRACTING WATER SAMPLES FOR CHLORIDE ANALYSIS. GENERAL GROUND-WATER TECHNIQUES, by Norbert J. Lusczynski. 1961, 8p. 3 refs. Geological Survey Water-Supply paper 1544-A.

DESCRIPTORS: *Water supplies, Well drilling, Chlorides, Titration, Sampling, Water filters, Hydrology.

The filter-press method is an adaptation of techniques used in the petroleum field; it was found to be suitable not only for sand and silt but also for silty-clay and solid-clay core samples. It involves extracting interstitial water from core samples by means of a filter press and analyzing the filtrate for chloride content by titration. The results obtained by the filter-press method are consistent with those obtained by other methods.

Order from GPO $1.00 as
I 19.3:1104-B

Geological Survey, Washington, D. C.
GEOLOGY OF THE BERNAL-JALPAN AREA ESTADO DE QUERETARO, MEDICO. GEOLOGIC INVESTIGATIONS IN MEXICO, by Kenneth Segerstrom. 1961, 86p. 22 refs. Geological Survey bulletin 1104-B.

DESCRIPTORS: *Geology, *Geological survey, *Mexico, Rock, Sedimentation, Minerals, Ores, Deposits, History, Geography.

The area of this report extends from Bernal northeastward to Jalpan, a distance of about 75 km, and lies mostly in the rugged and relatively inaccessible Sierra Madre Oriental, just east of the Mexican Highland. Ore deposits, chiefly lead, zinc, and antimony, but also gold and silver, are widely distributed between Bernal and Jalpan. The chief mining districts are Pinal de Amoles and Rio Blanco, which lie along a poorly defined belt of metalliferous mineral deposits extending from Xichu, Guanajuato, southeastward across the States of Queretaro and Hidalgo to Teziutlan, Puebla.

Order from GPO $1.00 as
I 19.3:1108-A

Geological Survey, Washington, D. C.
GEOLOGY OF THE MOUNT MCKINLEY QUADRANGLE, ALASKA. MINERAL RESOURCES OF ALASKA, by John C. Reed, Jr. 1961, 36p. 29 refs. Geological Survey bulletin 1108-A.

DESCRIPTORS: *Mountains, *Geology, *Geological survey, *Alaska, Rock, Sedimentation, Minerals, Deposits, Coal, Clays.

The Mount McKinley quadrangle, in south-central Alaska, includes parts of the Alaska Range, the Tanana and Kuskokwim lowlands, and the Kuskokwim Mountains. Schists of Precambrian age crop out in the northern foothills of the Alaska Range. Sedimentary and volcanic rocks of Paleozoic and Mesozoic age are exposed in the Kuskokwim Mountains, where little is known of their distribution and character, and in the Alaska Range, where they occupy the axial part and northern limb of a great synclinorium. Granitic batholiths, largely of Mesozoic age, intrude the Paleozoic and Mesozoic rocks in the Alaska Range. Deposits of gold, silver, and antimony occur in the Kantishna Hills, and lead-zinc deposits are found at Mount Eielson. Copper, lead, zinc, and mercury occurrences have been reported from the foothills of the Alaska Range west of the Muldrow Glacier.

Order from GPO $2.00 as
I 19.13:1526

Geological Survey, Washington, D. C.
HYDRAULIC AND HYDROLOGIC ASPECTS OF FLOOD-PLAIN PLANNING, by Sulo W. Wiitala, Karl R. Jetter, and Alan J. Sommerville. 1961, 69p. Geological Survey Water-Supply paper 1526.

DESCRIPTORS: Geological survey, Water supplies, *Hydraulic research, Engineering, *Hydrology, *Floods, Control, Mathematical prediction, Hazards.

This study shows how hydraulic and hydrologic data concerning the flood regimen of a stream can be used in appraising its flood potential and the risk inherent in occupation of its flood plain. The approach involves the study of flood magnitudes as recorded or computed; flood frequencies based on experience shown by many years of gaging-station record; use of existing or computed stage-discharge relations and flood profiles; and, where required, the preparation of flood-zone maps to show the areas inundated by floods of several magnitudes and frequencies.

Order from GPO $4.50 as
I 19.3:1090

Geological Survey, Washington, D. C.
IRON AND COPPER DEPOSITS OF KASAAN PENINSULA, PRINCE OF WALES ISLAND, SOUTHEASTERN ALASKA, by L. A. Warner, E. N. Goddard and others. 1961, 136p. 30 refs. Geological Survey bulletin 1090.

DESCRIPTORS: *Iron, *Copper, Deposits, Alaska, Geology, Rock, Ores, Mining engineering.

The deposits are mostly small and irregular but of relatively high grade. The chief ore minerals are magnetite, pyrite, and chalcopyrite, and the gangue is largely tactite consisting of garnet, epidote, diopside, and hornblende. Total reserves for the area are estimated at about 4 million long tons of iron ore containing an average of 50 percent of iron and 1.5 million short tons of copper ore, most of which contains less than 2 percent copper. Only small quantities of phosphorus and titanium are present, but the sulfur content may average between 1 percent and 4 percent, the amount being roughly proportional to the copper content. The reserve figure includes only a small amount of high-grade copper ore. Recoverable amounts of gold and silver are in many of the deposits

Order from GPO $0.15 as
I 19.13:1545-B

Geological Survey, Washington, D. C.
METHODS FOR DETERMINING THE PROPER SPACING OF WELLS IN ARTESIAN AQUIFERS. METHODS OF AQUIFER TESTS, by S. M. Lang. 1961, 16p. 5 refs. Geological Survey Water-Supply paper 1545-B.

DESCRIPTORS: *Water supplies, Test methods, Geology, Hydrology, Equations.

The Theis nonequilibrium formula can be modified to provide for convenient solution of innumerable problems of limited scope in ground-water hydraulics. An example of the type of modification of the formula that can be made is presented.

Order from GPO $0.25 as
I 19.16:414C

Geological Survey, Washington, D. C.
SOME OBSERVATIONS ON THE HYDROCHEMISTRY AND SEDIMENTATION OF THE CHAMBERLIN GLACIER AREA, ALASKA. SHORTER CONTRIBUTIONS TO GENERAL GEOLOGY, by Frank H. Rainwater and Harold P. Guy. 1961, 14p. 3 refs. Geological Survey Professional Paper 414-C.

DESCRIPTORS: *Geology, Geological survey, *Glaciers, *Alaska, *Hydrology, *Chemistry, *Sedimentation, Water, Sampling, Precipitation, Measurement.

This report describes a reconnaissance of the hydrochemical and sediment characteristics of Chamberlin Glacier near Barter Island Alaska. Twenty-eight observations of the streamflow and one of the precipitation were made to define the important aspects of hydrochemistry and sedimentation during the 2-month period of record July to August 1958. The sampling program had to be planned without prior knowledge of the conditions in the vicinity of the glacier. The adequacy of this program is evaluated in the last section of the report and suggestions are offered that may be useful in designing future studies of this kind.

Order from GP $0.25 as
I 19.3:1121-I

Geological Survey, Washington, D. C.
SPLIT ROCK FORMATION (MIOCENE) AND MOONSTONE FORMATION (PLIOCENE) IN CENTRAL WYOMING. CONTRIBUTIONS TO GENERAL GEOLOGY, by J. D. Love. 1961, 39p. 35 refs. Geological Survey bulletin 1121-I.

DESCRIPTORS: *Geology, Geological survey, *Wyoming, *Rock, Geological time, Paleoecology.

The Split Rock formation of Miocene age has an outcrop area of more than 1,500 square miles in central Wyoming and a maximum thickness of nearly 3,000 feet. It consists chiefly of gray poorly consolidated quartz sandstone with lesser amounts of tuff, pumicite, limestone, and claystone. Nodules of uraniferous chalcedony are present in several zones. The formation unconformably overlies Oligocene and older rocks and has partly buried the granite core of the Granite Mountains. The volume of that part of the Split Rock formation still preserved in the area is estimated as 250 cubic miles, of which approximately 200 cubic miles is sandstone. Fossil vertebrates in the lower part are of early Miocene age and those in the middle and upper parts are of middle Miocene age.

Order from GPO $0.65 as
I 19.16:374-H

Geological Survey, Washington, D. C.
STRATIGRAPHY OF OUTCROPPING PERMIAN ROCKS IN PARTS OF NORTHEASTERN ARIZONA AND ADJACENT AREAS. SHORTER CONTRIBUTIONS TO GENERAL GEOLOGY, by C. B. Read and A. A. Wanek 1961, 10p. 14 refs. Geological Survey Professional Paper 374-H.

DESCRIPTORS: *Geology, Geological survey, *Arizona, *Rock, Classification.

Rocks definitely or tentatively classified as Permian in age crop out in a number of uplifts in the Colorado Plateaus Province in northeastern Arizona and adjacent parts of New Mexico and Utah. This report specifically treats of these rocks in the Zuni uplift, the Defiance uplift, and the Monument Valley upwarp.

Order from GPO $0.55 as
Y 3.In 8/8:10/13

Inter-Agency Committee on Water Resources.
SINGLE-STATE SAMPLER FOR SUSPENDED SEDIMENT. Rept. no. 13 on A Study of Methods Used in Measurement and Analysis of Sediment Loads in Streams. 1961, 105p. 12 refs.

DESCRIPTORS: *Sedimentation, Containers, Hydraulic systems, Fluid flow, Velocity, Sand, Sampling, Impingers.

A single-stage sampler is a simple container equipped with intake and exhaust tubes; the sampler is used to obtain suspended-sediment samples automatically (without immediate attention) when a water surface first rises to a selected stage. Because single-stage sampling imposes special restrictions on intake and exhaust components, the intake velocity of the single-stage sampler does not adjust to stream velocity. Therefore, several types of single-stage samplers are required to cover a range of hydraulic conditions. Four types of single-stage samplers have been approved but may require modification for some sampling conditions.

Mineralogy

Order from GPO $4.50 as
I 28.37:960/v.1

Bureau of Mines [Washington, D. C.]
MINERALS YEARBOOK, 1960, VOLUME 1. METALS AND MINERALS (EXCEPT FUELS). [1961] 1294p.

DESCRIPTORS: *Minerals, *Metals, Metallurgy, Mining engineering, Engineering, Injuries, Economics, Rare earths, Rare earth elements, Silicon, Industrial production, Consumption, Labor, Wages, Technological intelligence.

MINERALS YEARBOOK, 1960, published in three volumes, provides a record of performance of the Nation's mineral industries during the year, with enough background information to interpret the year's developments. Volume I includes chapters on metal and nonmetal mineral commodities except mineral fuels. In addition, it includes a chapter reviewing these mineral industries, a statistical summary, and chapters on mining and metallurgical technology, employment and injuries, and technologic trends. One new chapter, High-Purity Silicon, has been added to

the list of commodity chapters. The chapter on Nonferrous Secondary Metals has been discontinued and the statistical material in it distributed to the appropriate nonferrous metals commodity chapters.

Order from GPO $2.50 as
I 28.37:960/v. 2

Bureau of Mines [Washington, D. C.]
MINERALS YEARBOOK, 1960, VOLUME 2. FUELS. [1961] 509p.

DESCRIPTORS: *Minerals, *Fuels, Coal, Bitumens, Coke, Chemicals, Petroleum, Carbon black, Natural gas, Gases, Liquids, Helium, Industrial production, Fuel consumption, Mining engineering, Injuries, Petroleum industry, Industry, Economics.

Volume II includes chapters on each mineral fuel, an employment and injuries presentation, and a mineral-fuels review chapter that summarizes developments in the fuel industries. (See also GPO I 28.37:960/v. 1)

MITS-47 $1.25

Massachusetts Inst. of Tech., Cambridge.
THE ADAPTATION OF NEW RESEARCH TECHNIQUES TO MINERAL ENGINEERING PROBLEMS. Semi-annual progress rept. for the six-month period ending 31 Oct 61, on Contract AT(30-1)-956. Feb 62, 52p. 8 refs.

Physics of the Atmosphere

AD-257 529 repriced $1.75

Isotopes, Inc., Westwood, N. J.
MIXING AND TRANSFER WITHIN THE STRATOSPHERE, by Herbert W. Feely and Jerome Spar. Rept. on Contract DA 29-044-XZ-609. 31 Dec 60, 69p. 8 refs. DASA 1222.

DESCRIPTORS: *Stratosphere, Sampling, Airborne, *Particles, Distribution, Mixtures, *Radioactive isotopes, Collecting methods, Abundance, Aircraft.

Preliminary data on Phases 4 and 5 of Crowflight are given. The recalibrated U-2 duct curves are given. Tritium and Carbon-14 concentrations in New Jersey rain and air samples during 1959 and 1960 respectively are reported. The manner of mixing and transfer of Strontium-90 in the stratosphere is described. The seasonal increase in mixing from the tropical to polar regions is noted Tungsten-185 distributions are discussed. Measurements of Rhodium-102 indicate that Teak and Orange debris has entered the lower stratosphere. A mean residence time of less than 10 years for this debris is suggested. Concentrations of Beryllium-7, a cosmic-ray product, are reported. Strontium-89 and Cerium-144 data is discussed in the light of the HASP mixing model. The size distribution and composition of stratospheric particles collected on electron microscope probes exposed in the stratosphere is described. Particles in the size range 0.1 to 1.5 microns appear to be composed of ammonium persulphate. A stratospheric inventory of 5.7 x 10 to the 7th power Kg of SO_4 is deduced. (Author)

TID-13093 $1.10

Massachusetts Inst. of Tech., Cambridge
THE CIRCULATION OF THE STRATOSPHERE. Status rept. on Contracts AT(30-1)-2242 and AF19(604)-5223. 1 July 61, 10p.

ENGINEERING

Order from GPO $2.50 as
D 101.52/2: 961/v. 4

Army Research Office, Washington, D. C.
ARMY RESEARCH TASK SUMMARY, FISCAL YEAR 1961. VOLUME 4. ENGINEERING SCIENCES AND EARTH SCIENCES. 535p.

DESCRIPTORS: *Engineering, Aeronautics, Civil engineering, Electrical engineering, Mechanical engineering, Ordnance, *Geophysics, Mapping, Geodesics, Earth, Physics, Geography, Astronomy, Astrophysics, Meteorology, *Military research

Engineering sciences
- Aeronautical engineering
- Civil engineering
- Electrical engineering
- Mechanical engineering
- Ordnance engineering

Earth Sciences
- Cartography and geodesy
- Earth physics
- Geography
- Astronomy and astrophysics
- Meteorology

(See also PB 171 003, PB 171 004)

Order from GPO $1.50 as
D 211.9:1451

David Taylor Model Basin, Washington, D. C.
SHIP VIBRATION, by R. T. McGoldrick. Dec 60, 248p. 175 refs. Rept. 1451.

DESCRIPTORS: *Ship hulls, *Hydrodynamics, *Ships, Vibration, Elasticity, Submarine hulls, Dynamics, Water waves, Pressure, Damping, Vibration mechanisms, Mechanics, Marine propellers, *Marine engineering, Ship plates, Structures, Analog systems, Digital systems, Beams, Model tests, Theory, Submarines, Ship turbines, Design, Partial differential equations.

Details are given on the general subject of ship vibration, including both the structural and hydrodynamic phases of the subject. Brief mention is also made of vibration in the propulsion system. Procedures for

dealing with the problem of ship vibration in the design stage are suggested. An introduction to hydroelasticity is included. (Author)

Aeronautical Engineering

PB 159 326 $10.10

[Electronic Systems] Lab., Mass. Inst. of Tech., Cambridge.
AN EXPERIMENTAL ANALOG-DIGITAL FLIGHT SIMULATOR, by A. W. Herzog and M. Fischer. Rept. on Contract N61339-45. Dec 59, 126p. 16 refs. Technical rept. NAVTRADEVCEN 45-2; AD-234 504.

DESCRIPTORS: *Flight simulators, *Analog to digital converters, Design, Operation, *Aircraft, Flight paths, Mathematical analysis, *Non-linear differential equations, Programming, Coding

A description is given of a system which was tested to determine the feasibility of combining analog and digital elements in a computer suitable for solving, in real time, a set of non-linear differential equations such as those pertaining to aircraft flight. Data and programming instructions, and all calculations except integration with respect to time, were performed by the digital section. Integration and generation of manually-adjusted control signals were accomplished in the analog section. Signals were transmitted between the digital and analog elements via analog gates and a time-shared decoder and encoder. The set of equations describes flight at a fixed altitude and at speeds varying about a mean value of Mach 0.7. The system could be operated at a maximum solution rate of sixty per second. Results were in agreement with values obtained from an all-digital study performed at 1/72 real time and much greater precision. At a solution rate of thirty per second, the responses were acceptable, and a more complex set of equations describing flight at all altitudes and speeds, including landing and take-off, could be solved by this technique. The effects of reduced precision in the decoding and encoding operations were observed. Round-off to less than six bits produced completely erroneous results. This experimental system provided useful information regarding the more important characteristics of the various components, information which should be useful in designing new and improved systems. (Author)

PB 159 325 $9.60

[Electronic Systems] Lab., Mass. Inst. of Tech., Cambridge.
THE PULSED ANALOG DEMONSTRATION COMPUTER, by A. W. Herzog and M. Fischer. Rept. on Contract N61339-45. Dec 59, 117p. 18 refs. Technical rept. NAVTRADEVCEN 45-1; AD-234 503.

DESCRIPTORS: *Analog computers, *Flight simulators, Design, Aircraft, Aerodynamic data, Machine translation, Digital systems.

One of two demonstration systems which were designed, built, and tested to determine the feasibility of combining analog and digital elements in a real time flight simulator is described. The demonstration pulsed analog computer described has no digital memory. The objective is to test only the most novel feature of the concept, i.e., the time-sharing of analog computing elements. A family of unique high-speed analog and digital units suited for this application are described. Included are a quarter-square multiplier, summing the difference amplifiers, storage and sample gates, an absolute magnitude circuit, a squaring circuit, integrators, and a trochotron program control. Test results on these individual units and on the complete demonstration system are presented, including the solution of a representative aircraft transient. Conclusions show that the time-sharing of analog computing elements is feasible and that a substantial saving in equipment would result. A family of analog elements, accurate to within $\pm$ 0.1%, and permitting arithmetic operations every 10 microseconds, is well within reach of current technology. When used in conjunction with appropriate digital equipment, special purpose pulsed analog computers for such operations as function generation would greatly enlarge the computing capability of such equipment. (Author)

AD-269 592 $8.10

National Research Labs., Ottawa (Canada).
TRAJECTORY ANALYSIS IN AIRCRAFT ACCIDENT INVESTIGATION, by S. R. Gwilt. Oct 61, 81p. 8 refs. Aeronautical rept. LR-310; NRC no. 6585.

DESCRIPTORS: *Aviation accidents, Airplanes, *Fragmentation, Terminal ballistics, Exterior ballistics, Dynamics, Aerodynamics, Mathematical analysis, Tables, Range tables.

With the publication of trajectory tables compiled by personnel of the Aerodynamics Section, National Aeronautical Establishment, it has been possible to outline some methods of their application in analyses following aircraft disintegration. Examples are given for the determination of throw-distances and times which are directly useful to the accident investigator. In general, a trajectory analysis may be used to determine a region of primary failure and so may form a basis for a more detailed structural analysis. In addition to the calculation of trajectories, methods are also outlined for the determination of wind vectors, heights and positions of item separation, and also for estimates of drag coefficients and terminal velocities for falling items. (Author)

Chemical Engineering

IS-348 $0.75

Ames Lab., Iowa State U. of Science and Tech.
RESEARCH REPORT IN ENGINEERING. Annual summary rept. 1 July 60-30 June 61, on Contract W-7405-eng-82. Aug 61, 44p. 144 refs.

ANL-6413 $3.00

Argonne National Lab., Ill.
CHEMICAL ENGINEERING DIVISION. Summary rept. July-Sep 61, on Contract W-31-109-eng-38. 217p. 36 refs.

PB 159 860-5 $2.60

Battelle Memorial Inst., Columbus, Ohio.
THE DEVELOPMENT AND STANDARDIZATION OF THERMAL-COMPRESSION SEA-WATER DISTILLATION UNITS, by J. A. Eibling and J. M. Allen. Progress rept. no. 5, 20 Mar-19 June 54, on Contract NOy-73219. June 54, 23p.

DESCRIPTORS: *Sea water, Water Desalination, *Distilling plants, Design, Standardization, Diesel engines, Compressors, Test methods, Test equipment, Tests, Water supplies.

This report describes the test procedure and test equipment for testing engines and compressors for thermal-compression sea-water stills and gives the results of tests of an Oliver 166 D engine, which show that the performance of the Oliver engine is typical of diesel engines of its class. Curves plotted from test data obtained at various speeds and loads indicate that the best fuel economy occurs at a speed of less than 1000 rpm, for outputs in the range required for the 85-gph still. However, engine vibration at this speed was excessive. Much smoother operation occurred at a speed of 1200 rpm. Further, the maximum availability of waste heat from coolant occurred at about 1200 rpm. About 430, 560, 680, and 880 Btu per min were available at horsepower outputs of 5, 715, 10, and 15, respectively. The fuel consumption at 1200 rpm was 0.62, 0.58, 0.55, and 0.48 lb per (bhp) (hr) at these same outputs. (Author)

PB 159 860-7 $2.60

Battelle Memorial Inst., Columbus, Ohio.
THE DEVELOPMENT OF THERMAL-COMPRESSION SEA-WATER DISTILLATION UNITS, by J. A. Eibling and J. M. Allen. Progress rept. no. 7, 1 Feb-30 Apr 55, on Contract NOy-73219. May 55, 25p. 2 refs.

DESCRIPTORS: *Sea water, Water, Desalination, *Distilling plants, Design, Diesel engines, Compressors. Tests, Heat exchangers, Evaporators, Water supplies.

A new Read Standard compressor Model 45B11 was tested. The results showed that the over-all adiabatic efficiency was approximately 52 per cent when used on a clean 90-gph still. Four designs of concentric triple-tube feedwater heat exchangers are given. The best heat exchanger appears to be one made up of 1/2-in., 7/8-in., and 1-1/4-in. tubes with blowdown in the inner tube, feedwater in the inner annulus, and distillate in the outer annulus. The possibility of wrapping the heat exchanger around the evaporator to conserve space and to eliminate return bends is discussed. A comparison of the best double-tube and the best triple-tube heat exchanger shows that there is little difference between them insofar as weight and pressure drop are concerned, although the double tube configuration appears to be slightly better. The triple-tube unit, however, would probably require slightly less space. A venting system suitable for a 90-gph still is described. (Author)

PB 159 860-8 $2.60

Battelle Memorial Inst., Columbus, Ohio.
THE DEVELOPMENT OF THERMAL-COMPRESSION SEA-WATER DISTILLATION STILLS, by J. M. Allen and W. A. Spraker. Progress rept. no. 8, 1 May-31 July 55, on Contract NOy-73219. Aug 55, 25p.

DESCRIPTORS: *Sea water, Water, Desalination, *Distilling plants, Diesel engines, Evaporators, Design, Tests, Water supplies.

The test program on engines has been completed with the testing of the Continental ZD129 and the Hallett WC2 engines. Performance curves on these engines are given. Data obtained during the compressor test program using the Meco 85-gph still were used to calculate the size of evaporator needed to give a pressure rise of 4 in. Hg. for an improved still. Calculations were also made to show the extent of possible improvment in heat transfer in the evaporator. These indicate that large increases in the boiling and condensing film coefficients are possible if forced circulation on the boiling side and dropwise condensation on the condensate side can be achieved. (Author) (See also PB 159 860-7)

PB 181 146 $0.50

Bureau of Naval Weapons, Washington, D. C.
LIQUID VOLUME 1 TO 1000 MILLILITERS. BuWeps-BuShips Calibration Program. 6 Oct 61, 14p. [Secondary] Standards Lab. Measurement System Operation Procedure NW-01.

DESCRIPTORS: *Glass, *Cylindrical bodies, *Liquids, *Volumetric analysis, Laboratory equipment, Calibration, Instrumentation, Instruction manuals.

This procedure describes the operation of a standards laboratory calibration system which is used to calibrate graduated glass cylinders "to contain" or "to deliver." The limit of error in the total or partial capacity of instruments calibrated by this method will not exceed 0.12 milliliter (ml) or 20% more than the limit of error for the instrument, whichever value is greater.

HW-69415 $0.50

Hanford Atomic Products Operation, Richland, Wash.
CONTINUOUS DISSOLUTION OF PLUTONIUM-BEARING SLAG AND CRUCIBLE RESIDUES, by H. W. Crocker. Rept. on Contract AT(45-1)-1350. June 61, 12p. 3 refs.

Order from GPO $0.30 as
C 13.44:36

National Bureau of Standards, Washington, D. C.
EFFECT OF MORTAR PROPERTIES ON STRENGTH OF MASONRY, by Cyrus C. Fishburn. 20 Nov 61, 45p. NBS Monograph 36.

DESCRIPTORS: *Mortar, Physical properties, Bonding, Concrete, *Walls, Construction, Test equipment.

The compressive strength of the walls increased, in general, with the compressive strength of the the mortar. The racking and flexural strengths of the walls increased with the bond strength of the mortar. The strength of bond test specimens tended to increase with the compressive strength of the wet consistency mortars that were used. However, bond strength appeared to be the dominant factor affecting the racking and flexural strength of the walls. Increase in both bond strength and wall strength with compressive strength of the mortar was not proportional to the relative compressive strengths of the type N and type S mortars.

ORNL-3220 $0.50

Oak Ridge National Lab., Tenn.
DISSOLUTION OF BeO- AND Al_2O_3-BASE REACTOR FUEL ELEMENTS. PART I, by K. S. Warren, L. M. Ferris, and A. H. Kibbey. Rept. on Contract W-7405-eng-26. Mar 62, 22p. 25 refs.

ORNL-3204 $1.25

Oak Ridge National Lab., Tenn.
RECOVERY OF STRONTIUM AND RARE EARTHS FROM PUREX WASTES BY SOLVENT EXTRACTION, by R. P. Wischow and D. E. Horner. Rept. on Contract W-7405-eng-26. Mar 62, 48p. 14 refs.

IDO-14572 $0.50

Phillips Petroleum Co., Idaho Falls.
A BENCH-SCALE NATURAL-RECIRCULATION DISSOLVER, by E. E. Erickson. Rept. on Contract AT(10-1)-205. 10 Jan 62, 20p. 2 refs.

IDO-14578 $0.50

Phillips Petroleum Co., Idaho Falls.
SALT PHASE CHLORINATION OF REACTOR FUELS. III. CATALYZED DISSOLUTION OF URANIUM DIOXIDE IN LEAD CHLORIDE-CHLORINE SYSTEMS, by E. M. Vander Wall, D. L. Bauer, and H. T. Hahn. Rept. on Contract AT(10-1)-205. 5 Feb 62, 23p. 6 refs.

Civil Engineering

PB 159 799 $1.60

Army [Cold Regions Research and Engineering Lab.] Wilmette, Ill.
EXCAVATIONS IN FROZEN GROUND: IGLOO FOXHOLES, by Robert Benert. Sep 60, 17p. 2 refs. Technical rept. 77.

DESCRIPTORS: *Explosives, *Underground explosions *Permafrost, *Underground structures, Shelters, Construction, *Excavators, Earth moving equipment.

Tests were conducted near Houghton, Mich., in Dec 54 to determine the feasibility of producing man-sized cavities beneath the frozen ground layer. Charges from 0.1 - 10 lb of low-velocity explosives (Coalite 7S and Gelodyn 1) were fired at depths from 10.5-48 in. in ground frozen to a depth of 6-24 in. The development of these igloo-shaped foxholes by explosive is not recommended since it is not possible to predict accurately the amount of explosive required and the igloo shape is not suitable for combat areas. However, 1-2 lb of Coalite 7S is sufficient to produce a 24-in diam crater in ground frozen to a depth of 1-2 ft. The crater can be enlarged easily by excavating the underlying thawed ground. (Author)

PB 159 798 $2.60

Army [Cold Regions Research and Engineering Lab.] Wilmette, Ill.
PERMAFROST TUNNEL, CAMP TUTO, GREENLAND, by John F. Abel, Jr. Oct 60, 25p. 6 refs. Technical rept. 73.

DESCRIPTORS: *Permafrost, *Excavators, Earth moving equipment, *Underground structures, Glaciers, Mining engineering, Greenland.

An experimental tunnel, 300 x 10 x 9 ft, was driven into a glacial till hillside near Camp TUTO during the summer of 1959 for the purposes of determining the characteristics of the glacial till at depth. The employment, effectiveness, and possible improvement of the mining methods and equipment are discussed. Excavation of frozen glacial till by conventional mining methods, modified slightly to allow for low temperatures, is feasible. Problems for future study are suggested. (Author)

Electrical and Electronic Engineering

PB 159 572 $1.10

Aeronautical Research Labs. [Office of Aerospace Research] Wright-Patterson AFB, Ohio.
MEASUREMENT OF THE BEAM MODULATION FACTOR FOR IMAGE ORTHICONS, by Radames K. H. Gebel. Rept. on Research on the Quantum Nature of Light. Oct 60, 10p. WADC Technical note 59-131, supplement 1; AD-249 106.

DESCRIPTORS: *Iconoscopes, *Image tubes, Electron tubes, Electron beams, Electron multipliers, *Cathode ray tubes, Television equipment, Video signals, Oscilloscopes, *Modulation.

A simple but useful method is explained for determining the modulation factor for an image orthicon operating at maximum performance, which occurs at the knee of the characteristic curve. (See also PB 161 951)

PB 159 847 $7.60

Automatic Mfg. Div., General Instrument Corp., Newark, N. J.
INDUSTRIAL PREPAREDNESS STUDY ON HIGH VOLTAGE SILICON RECTIFIERS, by Robert W. Hull and Bernard Kravitz. Quarterly progress rept. no. 1, 31 May-31 Aug 56, on Contract DA 36-039-sc-72679(L). [1956] 72p. AD-113 341.

DESCRIPTORS: Industrial mobilization, *Silicon, *Rectifiers, Crystal rectifiers, Voltage, Voltage regulators, Design, Production, Tests, Military requirements, Diodes, Single crystals, Crystals.

The present state of the art on alloy silicon junction rectifiers is reviewed and the properties of the standard rectifiers are described. The military diode requirements are discussed as applied to this particular high voltage rectifier. Detailed discussion is presented on the following phases of fabrication technology: The silicon crystal; junction formation and base connections; surface treatment; surface protection. (Author) (See also PB 136 735)

PB 159 850 $14.00

Bendix Systems Div., Bendix Corp., Ann Arbor, Mich.
ELECTRONIC CIRCUIT RESEARCH AND DEVELOPMENT FOR NUCLEAR PROPELLED VEHICLES, by R. C. Green. Interim engineering rept. no. 1, 1 Oct 60-1 Jan 61, on Contract AF 33(600)42262, continuation of Contract AF 33(600)35026. [1961] 206p. 25 refs. BSR-439; AD-252 148.

DESCRIPTORS: *Electronic circuits, Radio beacons, Transmitter receivers, Radio receivers, Identification systems, Radar equipment, Radio equipment, Radar transmitters, *Radar beacons, Electronic equipment, Neutron bombardment, *Radiation damage, Test facilities, Test equipment, Test sets, Tests, Nuclear propulsion, Aircraft.

Contents: Marker beacon receiver AN/ARN-32; UHF transceiver AN/ARC-34; Radio receiving set AN/ARN-31; TACAN transceiver AN/ARN-21; Air-to-ground identification set AN/APX-19; Radio beacon AN/ART-27 (XA-5); Air-to-air identification system (Transponder set AN/APX-27); Nuclear environment; Component evaluation; Operating conditions; and Circuit design for nuclear environment.

PB 181 150 $0.50

Bureau of Naval Weapons, Washington, D. C.
AC-DC DIFFERENTIAL VOLTMETER, FLUKE 803. BuWeps-BuShips Calibration Program. 6 Oct 61, 27p. [Secondary] Standards Lab. Instrument Calibration Procedure AE-26.

DESCRIPTORS: *Voltmeters, Calibration, Instrumentation, Instruction manuals, Alternating current, Direct current.

The Test Instrument consists of a VTVM section, a direct voltage measuring section, a voltage divider section, and an alternating voltage measuring section including an ac to dc converter.

PB 181 160 $0.50

Bureau of Naval Weapons, Washington, D. C.
ANALYZERS, DISTORTION, HEWLETT PACKARD 330B AND HO1-330D. BuWeps-BuShips Calibration Program, 9 Jan 62, 44p. [Secondary] Standards Lab. Instrument Calibration Procedure AW-12.

DESCRIPTORS: *Signals, *Distortion, Analysis, Measurement, Calibration, Instrumentation, Instruction manuals.

The Test Instrument, which consists of an amplifier, a variable frequency rejection filter, and a VTVM, measures distortion by the rejection of the fundamental signal. The input signal voltage is amplified and measured on the internal VTVM to establish a reference level. The fundamental frequency of the test signal is then rejected and that which remains (hum, noise, and harmonic distortion) is indicated by the internal VTVM as the percentage of distortion.

PB 181 165 $0.50

Bureau of Naval Weapons, Washington, D. C.
AUDIO SIGNAL GENERATORS, HEWLETT PACKARD 205 AG, TS-421/U, OR TS-421A/U. BuWeps-BuShips Calibration Program. 16 Nov 61, 28p. [Secondary] Standards Lab. Instrument Calibration Procedure AG-20, rev. 1.

DESCRIPTORS: Audiofrequency, *Signal generators, Generators, Calibration, Instrumentation, Instruction manuals.

The Test Instrument is an audio-frequency signal generator designed for gain and frequency response measurements in amplifiers or networks.

PB 181 166 $0.50

Bureau of Naval Weapons, Washington, D. C.
CALIBRATION PROCEDURE CHANGE NOTICE BOOK. Rept. for Nov 60-Jan 62, on BuWeps-BuShips Calibration Program. [1962] 122p.

DESCRIPTORS: Instruction manuals, *Calibration, Corrections.

PB 181 151 $0.50

Bureau of Naval Weapons, Washington, D. C.
DIFFERENTIAL VOLTMETER, FLUKE 801. BuWeps-BuShips Calibration Program. 6 Oct 61, 20p. [Secondary] Standards Lab. Instrument Calibration Procedure AE-18.

DESCRIPTORS: *Voltmeters, Calibration, Instrumentation, Instruction manuals.

The Test Instrument consists of a VTVM section, a direct voltage measuring section, and a voltage divider section.

PB 181 158 $0.50

Bureau of Naval Weapons, Washington, D. C. GENERATOR, SHF SIGNAL, HP 626A, AN/USM-47; HP 628A, AN/USM-48. BuWeps-BuShips Calibration Program. 13 Sep 61, 31p. [Secondary] Standards Lab. Instrument Calibration Procedure GG-08.

DESCRIPTORS: Superhigh frequency, *Signal generators, Generators, Calibration, Instrumentation, Instruction manuals, Broadband.

The Test Instrument is a general purpose, broadband, signal generator which produces RF power output levels of -90 dbm to +10 dbm over a frequency range of 10 to 15.5 Gc on the HP 626A or 18.0 to 21 Gc on the HP 628A. Both instruments have versatile modulation characteristics, including internal or external pulse, square wave and FM modulation.

PB 181 163 $0.50

Bureau of Naval Weapons, Washington, D. C. OSCILLATOR, TEST, HEWLETT PACKARD 650A. BuWeps-BuShips Calibration Program. 16 Apr 60, 31p. [Secondary] Standards Lab. Instrument Calibration Procedure AG-37.

DESCRIPTORS: *Oscillators, Test equipment, Calibration, Instrumentation, Instruction manuals.

The Test Instrument is a wide range, low distortion oscillator with a frequency range of 10 cps to 10 mc. It has a VTVM to monitor and an attenuator to control the range of output voltage. A 100:1 output voltage divider is also included to provide a low impedance (6 ohms) output.

PB 181 164 $0.50

Bureau of Naval Weapons, Washington, D. C. OSCILLATORS, WIDE RANGE, HEWLETT PACKARD 200 CD & HP SPECIFICATION 23680. BuWeps-BuShips Calibration Program. 16 Apr 60, 23p. [Secondary] Standards Lab. Instrument Calibration Procedure AG-36.

DESCRIPTORS: *Oscillators, Calibration, Instrumentation, Instruction manuals.

The Test Instrument is a wide range, low distortion oscillator with a frequency range of 5 cps to 600 kc.

PB 181 152 $0.50

Bureau of Naval Weapons, Washington, D. C. PORTABLE PRECISION POTENTIOMETER, RUBICON 2703 AND 2732. BuWeps-BuShips Calibration Program. 16 Apr 60, 12p. [Secondary] Standards Lab. Instrument Calibration Procedure AE-13.

DESCRIPTORS: *Potentiometers, Calibration, Instrumentation, Instruction manuals.

The Test Instrument is a self-contained potentiometer. The model 2733 differs from the 2703 by having an optically-expanded galvanometer scale for increased sensitivity.

PB 181 157 $0.50

Bureau of Naval Weapons, Washington, D. C. RANGE CALIBRATOR, TS-102/AP AND TS-102A/AP. BuWeps-BuShips Calibration Program. 4 Aug 61, 14p. [Secondary] Standards Lab. Instrument Calibration Procedure GG-12.

DESCRIPTORS: *Markers, *Pulse generators, Generators, Calibration, Instrumentation, Instruction manuals, Range.

The Test Instrument is a marker and pulse generator capable of producing markers at a frequency of 327.8 kilocycles (each marker is equivalent to a radar range of 500 yards) and sync pulses at repetition rates of 400, 800, 1600, and 2000 pulses per second. The markers have a maximum amplitude of 30 volts and a 0.4 microsecond duration. The sync pulses have an amplitude of 40 volts and a duration of 0.8 microseconds.

PB 181 159 $0.50

Bureau of Naval Weapons, Washington, D. C. RF BRIDGE, GENERAL RADIO 916-AL. BuWeps-BuShips Calibration Program. 22 Dec 61, 14p. [Secondary] Standards Lab. Instrument Calibration Procedure AZ-08.

DESCRIPTORS: Radiofrequency, *Electric bridges, Calibration, Instrumentation, Instruction manuals

This procedure describes the calibration of the General Radio 916-AL frequency bridge which measures resistance and reactance at frequencies between 50 kc and 5 Mc.

PB 181 155 $0.50

Bureau of Naval Weapons, Washington, D. C. STANDING WAVE INDICATOR, HP 415A, HP 415B OR AN/USM-37. BuWeps-BuShips Calibration Program. 20 Dec 61, 19p. [Secondary] Standards Lab. Instrument Calibration Procedure GV-03, supersedes GV-01 and GV-02.

DESCRIPTORS: *Standing wave indicators, Calibration, Instrumentation, Instruction manuals, *Voltmeters.

The Test Instrument is a high gain, narrow band, electronic voltmeter normally tuned to 1000 cps. It is typically applied in VSWR measurement systems in conjunction with a slotted line and suitable detector. The meter scales are calibrated to indicate directly in SWR or DB when used with a square law device such as crystal diode or barretter.

PB 181 149 $0.50

Bureau of Naval Weapons, Washington, D. C. STROBOSCOPE TS-805A/U, STROBOTAC, GENERAL RADIO 631-BL, 631-B. BuWeps-BuShips Calibration Program. 19 Jan 62, 8p. [Secondary] Standards Lab. Instrument Calibration Procedure AF-27.

DESCRIPTORS: *Stroboscopes, *Tachometers, Calibration, Instrumentation, Instruction manuals.

The Test Instrument is a stroboscopic tachometer which can be used to measure rotary motion from 600 to 14, 400 RPM (10 to 240 cps) to an accuracy of ±1%. It consists of a power supply, an oscillator, and a Strobotron (flashing light).

PB 181 148 $0.50

Bureau of Naval Weapons, Washington, D. C. TEST OSCILLATOR, HEWLETT PACKARD 650A. BuWeps-Bushipe Calibration Program. 11 Jan 62, 31p. Secondary Standards Lab. Instrument Calibration Procedure AG-08 (Revision 1).

DESCRIPTORS: *Oscillators, Test equipment, Calibration, Instrumentation, Instruction manuals.

The Test Instrument is a wide range, low distortion oscillator with a frequency range of 10 cps to 10 mc. It has a VTVM to monitor and an attenuator to control the range of output voltage. A 100:1 output voltage divider is also included to provide a low impedance (6 ohms) output.

PB 181 162 $0.50

Bureau of Naval Weapons, Washington, D. C. TEST SET, RADIO, AN/TRM-3. BuWeps-BuShips Calibration Program. 11 Jan 62, 34p. [Secondary] Standards Lab. Instrument Calibration Procedure AG-57, rev. 1.

DESCRIPTORS: *Radio equipment, *Test sets, Calibration, Instrumentation, Instruction manuals, *Sweep generators, Generators, Oscillators, Oscilloscopes.

The Test Instrument consists of an RF oscillator, a sweep generator, a 400~ oscillator, an oscilloscope, internal markers which are derived from crystal oscillators, modulating circuitry, an output power monitoring system, and various power supplies. The Test Instrument will provide cw output, amplitude modulated output, and frequency modulated output with adjustable deviation.

PB 181 147 $0.50

Bureau of Naval Weapons, Washington, D. C. THERMOCOUPLES, BASE METAL (EXCEPT COPPER-CONSTANTAN) AMBIENT TO 1100°C. BuWeps-BuShips Calibration Program. 25 Oct 61, 23p. [Secondary] Standards Lab. Measurement System Operation Procedure NT-05.

DESCRIPTORS: *Thermocouples, Calibration, Instrumentation, Instruction manuals.

This procedure describes the operation of a standards laboratory calibration system which is used to calibrate base-metal thermocouples, except copper vs constantan, to an accuracy of ± 1.0°C at observed points, or ± 2.0°C for interpolated values, within the range of ambient to 1100°C.

PB 181 154 $0.50

Bureau of Naval Weapons, Washington, D. C. TRIPLE POINT OF WATER CALIBRATION CHECK OF L&N 8163 PLATINUM RESISTANCE THERMOMETERS WITH L&N G-1 BRIDGE. BuWeps-BuShips Calibration Program. 13 Sep 61, 14p. [Secondary] Standards Lab. Instrument Calibration Procedure MT-02.

DESCRIPTORS: *Resistance thermometers, Thermometers, Calibration, Instrumentation, Instruction manuals, Water, Platinum

The Test Instrument is a laboratory-type precision resistance thermometer with a range of -190° to +500°C. Its resistance is about 25.5 ohms at 0°C, and it has a resistance change of about 0.1 ohm per °C.

PB 181 161 $0.50

Bureau of Naval Weapons, Washington, D. C. VACUUM TUBE VOLTMETER, HEWLETT PACKARD 410B OR ME-26A/U. BuWeps-BuShips Calibration Program. 9 Jan 62, 24p. [Secondary] Standards Lab. Instrument Calibration Procedure AQ-15.

DESCRIPTORS: *Electron tubes, *Voltmeters, Meters, Calibration, Instrumentation, Instruction manuals.

The Test Instrument is an EVM which can be used to measure direct voltages of either polarity, alternating voltages, RF voltages, and resistance.

PB 181 156 $0.50

Bureau of Naval Weapons, Washington, D. C. RADAR TEST SET, AN/UPM-33 (SPECTRUM ANALYZER TS-148/UP). BuWeps-BuShips Calibration Program. 17 Sep 61, 18p. [Secondary] Standards Lab. Instrument Calibration Procedure GQ-02.

DESCRIPTORS: *Radiofrequency spectrum analyzers, *Radar equipment, *Test sets, Calibration, Instrumentation, Instruction manuals, Oscillators.

The Test Instrument is a spectrum analyzer providing visual indications of the spectra of RF oscillators in the frequency range of 8500 to 9600 Mc. A frequency meter is incorporated in the instrument, permitting it to be used as a frequency measuring device.

PB 158 195 $1.60

[Eitel-McCullough, Inc., San Bruno, Calif.] FUNDAMENTAL STUDY OF OXIDE CATHODES, by E. A. Coomes. Final engineering rept. on Contract NObsr-64045. 25 Apr 55, 13p. 8 refs.

DESCRIPTORS: *Oxide cathodes, *Cathodes (Electron tubes), Thermionic emission, Determination, Single crystals, Crystals, Growth, Metals, Tungsten, Tantalum, Molybdenum.

This research was to study in a fundamental way the stability, efficiency, and available emission of thermionic cathodes (the oxide cathode being an important class), as they operate in electron tubes. Cathode patchiness and environment were considered prime parameters. (Author)

AD-269 430 repriced $6.00

Electro-Optical Systems, Inc., Pasadena, Calif.
DIRECT USE OF SOLAR-ENERGY FOR COMMUNICATION. PART I: ANALYSIS OF SOLAR-OPTICAL COMMUNICATION, by Duane E. Erway. Rept. on Contract AF 33(616)6310. Sep 61. 442p. 198 refs. EOS rept. 270, Final I; ASD Technical rept. 61-13, Part I.

DESCRIPTORS: *Light communication systems, Solar energy, Feasibility studies, Space flight, Communication system.

The analytical part of the SOCOM program consisted of studies of the theoretical and practical limitations of space communication systems using sunlight as a carrier, together with exploration of ways of simulating and testing such systems on the earth. The areas studied included: wavelength spectrum, optical systems, modulation and demodulation techniques, tracking and stabilization problems, system design, and simulation techniques. (Author)

PB 158 797 $8.60

Electronic Defense Labs., Mountain View, Calif.
LOW-FREQUENCY ANTENNA SYSTEM, by Ralph E. Reichold and Kenneth L. Walton. Study rept. Rept. on Contract DA 36-039-sc-85400. 23 Nov 60, 96p. 11 refs. Technical memo. no. EDL-M329; AD-253 263.

DESCRIPTORS: Low frequency, Antennas, Medium frequency, Antenna hardware, *Antenna masts, *Mobile, Design, Model tests, *Countermeasures, Ground support equipment, Mathematical analysis, Towers, Stability, Antenna radiation patterns, *Vehicle antennas, Armies, Measurement, *Dipole antennas.

A study was made to determine the feasibility of designing and building a LF (50- to 500 kc) antenna system to be used in mobile tactical applications. The tactical requirements of such a system impose certain mechanical and electrical limitations on the antenna design (size, weight, mobility, manpower needed for assembly, etc.) An evaluation of the various electrical and mechanical antenna configurations which were considered for this application is presented. The cap-loaded monopole is selected as the most feasible design which meets the rigid requirements of the system. (Author)

PB 157 780 $3.60

Electronic Defense Labs., Mountain View, Calif.
A STUDY OF ADAPTIVE CONTROL SYSTEMS, by Roy L. Rogers. Rept. on Contract DA 36-039-sc-85402. 16 Jan 61, 32p. 12 refs. Technical memo. no. EDL-M343; AD-252 649.

DESCRIPTORS: Control systems, Feedback oscillators, *Servo systems, Low pass filters, Low frequency, Guided missiles, Guidance, Special functions, Analog computers, Simulation, Stability, Errors.

Adaptive control systems are defined and classified according to whether the adaptive process is open- or closed-loop. Several examples with brief descriptions are given for various adaptive open-loop and adaptive closed-loop systems. The adaptive loop is analyzed for dynamic performance and stability effects on the control system. A 1-c bandwidth control system was simulated on an analog computer for the purpose of studying the closed-loop adaptive process. The slope of an error function, such as mean square error or mean absolute error, is detected by using two low-pass filters. Both one-parameter and a two-parameter adaptive control systems were investigated. (Author)

UCRL-13025 $5.60

Field Emission Corp., McMinnville, Oreg.
DEVELOPMENT OF FIELD EMISSION FLASH X-RAY TUBES AND DEVICES. Final rept. 2 Oct 59-1 Sep 60, on Subcontract 142. [1961] 61p. 17 refs.

APEX-666(Pt. 1) $3.00

General Electric Co., Cincinnati, Ohio
THE DEVELOPMENT PROGRAM OF THE ADVANCED CONTROL COMPONENTS UNIT, by N. Haberman, J. F. Hemmenway and others. Final rept. on Contracts AF 33(600)-38062 and AT(11-1)-171. Dec 61, 212p. 86 refs.

APEX-666(Pt. 2) $0.50

General Electric Co., Cincinnati, Ohio.
THE DEVELOPMENT PROGRAM OF THE ADVANCED CONTROL COMPONENTS UNIT (FLUID AMPLIFIER DEVELOPMENT), by A. L. Spivak and S. F. Hemmenway. Final rept. on Contracts AF 33(600)-38062 and AT(11-1)-171. Jan 62, 24p. 8 refs.

UCRL-6722 $0.50

Lawrence Radiation Lab., U. of California, Livermore.
Al_2O_3 FOILS CAPABLE OF TRANSMITTING HIGH-CURRENT RELATIVISTIC ELECTRON BEAMS, by William A. Sherwood and Ross E. Hester. Rept. on Contract W-7405-eng-48. 28 Dec 61, 14p. 4 refs.

PB 158 433 $6.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
DEVELOPMENT OF AN ADAPTIVE CONTROL SYSTEM, by Gunther R. Geiss and John D. Glomb. Rept. June 59-June 60, on Contract DA 30-069-ORD-2646. 19 Sep 60, 70p. 10 refs. Research rept. no PIBMRI-827-60; AROD rept. no. 2268:5-E; AD-247 224.

DESCRIPTORS: *Control systems, Instrumentation, Theory, Simulation, Design, Analog computers, Reliability, *Electronic equipment, *Electronic circuits.

Results of an adaptive control system simulation study, and the instrumentation techniques used, are presented. The system development is based on the identification and excitation philosophy proposed by various authors at the Polytechnic Institute of Brooklyn. The adaptive system under discussion may be considered as process-adaptive, plant-sensing, or system characteristic adaptive - depending upon the reader's classification preference. In systems of this type, the operational or atmospheric environment of the controlled process or plant causes variations in process characteristics. The adaptive controller adjusts system operation to compensate for environmental changes in process step-response. In general, the system has been shown to be feasible but impractical without further development. Areas for further study are suggested. (Author)

PB 158 716 $10.50

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
MILLIMETER WAVEGUIDE COMPOUNDS, by J. W. E. Griemsmann. Final rept. on Contract DA 36-039-sc-78001. 27 May 60, 137p. 7 refs. PIBMRI-819-60; AD-240 227.

DESCRIPTORS: *Waveguides, Germanium, Modulators, Dielectrics, Measurement, *Attenuation, Waveguide bends, Wavemeters, Power meters, Broadband, Design, *Microwave networks, *Microwave equipment, Mathematical analysis, Standing wave indicators, Interferometers.

Work is described on the use of high electric fields to produce saturation of the electron drift velocity in n-type germanium and thereby to modulate its microwave transmission properties with fast rise time. Pulsed dc fields of 3000 v/cm applied to thin germanium slabs inserted in the high field region of a slotted waveguide and oriented parallel to the rf electric field lines produced an attenuation change from about 13 db to a few tenths db at 37,000 mc. An experimental study of a form of open waveguide, H-guide, was carried out from 27-50 kmc/sec. A description is given of a standing wave machine used to measure the variation of field amplitude in the air region of the H-guide. A wavemeter based on the interferometer principle was constructed in C-band guide for use at frequencies greater than 30 kmc/sec. Multimode studies in circular waveguide concerned: (1) calculation and measurement of equivalent circuit parameters for various discontinuities in the H_{01} and E_{01} modes, (2) multimode components, and (3) transmission properties of 2N-port networks, with emphasis on optimum power transmission. (Author)

PB 159 854 $16.00

Moore School of Electrical Engineering, U. of Pennsylvania, Philadelphia.
THERMODYNAMICS OF RESISTORS, by P. N. Carlson, C. T. Hsu and others. Final rept. 4 Jan 51-24 Jan 53, on Contract AF 33(038)18417. 30 Apr 53, declassified 5 Nov 53. 248p. 8 refs. Research Div. rept. 53-24; AD-14 054.

DESCRIPTORS: *Resistors, Thermodynamics, Heat transfer, Thermal conductivity, Convection, Electronic equipment.

Results of an experimental analysis of heat conduction from resistors mounted in solid potting compounds are presented in graphical form in terms of isotherms in the solid conducting medium and resistor surface temperature levels. Tangent resistors as well as resistors mounted against high-conducting surfaces are considered. Thermal characteristics of fixed-composition resistors of several manufacturers are given. Results concerning the separation of heat transfer into radiation, free convection, and lead conduction are given in terms of convective heat-transfer coefficients. The effects of low pressure, power-input level, and thermal conductivity of the surrounding atmosphere are evaluated. A method of handling boundary-value problems mathematically is devised; and the problems of free convection about a vertical circular cylinder at uniform temperature, and forced convection past a circular cylinder are solved in principle.

PB 181 170 $3.00

Naval Research Lab., Washington, D. C.
THERMOELECTRICITY, by J. W. Davisson, Joseph Pasternak, and B. B. Rosenbaum (Bureau of Ships). Status rept. no. 8. Jan 62, 152p. 37 refs. NRL Memo. rept. 1241.

DESCRIPTORS: *Thermolelectricity, Electricity, *Thermoelectric generators, Generators, *Materials, Electrical properties, Semiconductors, Broadband.

Order from GPO $0.75 as
D 211.6/2:EL 2/3

Philco Corp., Philadelphia, Pa.
HANDBOOK OF MINIATURE PARTS FOR ELECTRONIC EQUIPMENT. Rept. on Contract NObsr-85021. 15 Apr 61, 145p. NAVSHIPS 93440(A).

DESCRIPTORS: Naval equipment, *Miniature electronic equipment, Electronic equipment, *Handbooks.

Order from GPO $0.25 as
D 211.6/2: El 2/3/supp. 1

Philco Corp., Philadelphia, Pa.
HANDBOOK OF MINIATURE PARTS FOR ELECTRONIC EQUIPMENT. Cumulative supplement no. 1. Contract NObsr-85021. 1 Oct 61, 45p. NAVSHIPS 93440(A)

DESCRIPTORS: *Miniature electronic equipment, Handbooks, Parts catalogs.

PB 159 724 $9.60

Stanford Electronics Labs., Stanford U., Calif.
EXPERIMENTAL INQUIRY INTO THE PRODUCTION OF LOW-NOISE MICROWAVE ELECTRON BEAMS, by W. R. Turner. Rept. on Contract Nonr-225(24). 24 Mar 61, 113p. 28 refs. Technical rept. no. 401-3; AD-254 866.

DESCRIPTORS: *Electron beams, L band, *Traveling wave tubes, Noise (Radar), C band, Reduction, *Cathodes (Electron tubes), Electron tubes, Electron guns, Measurement, Mathematical analysis, Theory, Cathodes, Noise analyzers, Microwave frequency, Test methods, Diodes, Integral transforms, Functions.

The investigation was concerned with the production of low-noise electron beams by the use of low-potential drift regions. Methods of calculating the noise current as a function of distance along the beam are indicated. Experimental attempts were made to use a virtual cathode in the establishment of a low-noise beam. It was found possible to reduce the beam noisiness to a value below that of full shot noise. However, more conventional operation of the gun, in which the beam was even more successful. Noise experiments for a total of eight traveling-wave tubes at L-band and two traveling-wave tubes at C-band are presented. Noise figures of 4.1 db at L-band (1200 Mc) and 5.2 db at C-band (5160 Mc) were obtained. The design of a readily interchangeable cathode for studies of the relation of noise figure to cathode activity is described. (Author)

Mechanical Engineering

ANL-6486 $2.00

Argonne National Lab., Ill.
FREE CONVECTION HEAT TRANSFER TO A SUPERCRITICAL FLUID: AN ANALYTICAL AND EXPERIMENTAL STUDY, by C. A. Fritsch and R. J. Grosh. Rept. on Contract W-31-109-eng-38. Nov 61, 83p. 59 refs.

UCRL-6665-T $2.00

Lawrence Radiation Lab., U. of California, Livermore.
FLASHING EXPANSION OF WATER THROUGH A CONVERGING-DIVERGING NOZZLE, by Robert Alan Brown. Rept. on Contract W-7405-eng-48. 24 Oct 61, 83p. 35 refs.

Ordnance, Missiles, and Satellite Vehicles

PB 159 804-1 $26.00

Air Research and Development Command, Washington, D. C.
PROCEEDINGS OF SYMPOSIUM ON GUIDED MISSILE RELIABILITY 8-10 DECEMBER 1958, PART I. [1959] 552p. 118 refs. AD-236 707.

DESCRIPTORS: Symposia, *Guided missiles, Reliability, Determination, Mathematical analysis, Military requirements, Design, Statistical analysis, *Human engineering, *Electronic equipment, *Quality control, *Guided missile personnel, *Training.

Unclassified papers were presented in the following areas: reliability testing; environment; mathematical theory; design techniques; reliability prediction; education and human factors; production problems; data collection and analysis; evaluation and measurement; and components and component specifications.

PB 159 697 $2.60

Allied Research Associates, Inc., Boston, Mass.
LAUNCHING OF AIRBORNE MISSILES UNDERWATER. PART IX. STATISTICAL MISSILE RESPONSE DUE TO WAVE INDUCED SUBMARINE ROLL, by Theodore R. Goodman and Theodore P. Sargent. Rept. on Contract Nonr-2343(00). 1 Mar 61, 22p. 1 ref. Document no. ARA-906; AD-251 620.

DESCRIPTORS: *Guided missiles, Underwater to air, Launching, Guided missile trajectories, Harmonic analysis, Ocean waves, Model tests, *Hydrodynamics, Underwater ballistics, Submarines, Roll.

In launching an airborne missile underwater from a submarine, the motion of the submarine induced by the waves of a confused sea is imparted to the missile as a set of random initial conditions. The statistical missile responses to these conditions are determined. The shape of the submarine considered here includes appendages and other realistic asymmetries. The submarine is stabilized in roll by means of a gyrostabilizer. (Author) (See also PB 157 610)

PB 159 844 $4.60

Army Ordnance Corps, Washington, D. C.
INTRUSION DETECTION SYSTEMS. May 61, rev. 28 July 61, 42p. ORDM 10-2.

DESCRIPTORS: *Ordnance detectors, Detectors, Design, Installation, Operation, Maintenance, Specifications, Costs, Procurement, Safety.

Intrusion detection systems provide a positive means of detecting and announcing the proximity of an intruder. An intrusion detection system cannot be used as a substitute for a police force; however, when properly planned and installed, an intrusion detection system can be an invaluable aid in obtaining maximum security with the most economical use of manpower. Police force personnel in themselves can provide effective, continuous protection when their duty posts are fixed or restricted to a specific point and their responsibilities can be efficiently carried out at that point.

PB 159 845 $4.60

Army Ordnance Corps., Washington, D. C.
PHYSICAL SECURITY STANDARDS. May 61, 47p. 20 refs. ORDM 10-3, supersedes ORDM 7-2, OCTI 1300-4-60, and OCTI 1300-8-60.

DESCRIPTORS: *Ordnance, *Military facilities, Security classification, Standards, Vehicles, Control, Lighting systems, Detectors, Monitors, Military police, Police, Communication systems, Materials, Safety.

This manual establishes physical security standards at Ordnance installations and activities where the Chief of Ordnance has a security and plant protection interest or responsibility. These standards are designed to furnish flexible protection for varying degrees of security. Specificially, they are intended to serve the following purposes: (1) Establish a base for planning a physical security program. (2) Serve as a base for evaluating existing physical security fixtures and practices. (3) Achieve uniformity between similar type installations and activities and establish uniform interpretations. (4) Provide specific guidance by defining the varying degrees of security and plant protection interests and establish the features of physical security necessary to furnish protection commensurate with the criticality of the matter being protected. (Author)

PB 159 831 $1.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
STANDARD ATMOSPHERE. June 51, declassified. 13p. 4 refs. Technical note no. 467.

DESCRIPTORS: *Atmosphere, Temperature, Sound, Velocity, Pressure, Density, Gravity, Acceleration, Tables, High altitude, High altitude bombing, Ordnance.

The tables define the proposed atmospheric structure for temperature, velocity of sound, pressure and density as functions of altitude up to 102,000 feet for average annual conditions for latitude 45°N. Table 1 gives acceleration of gravity also as a function of altitude for latitude 45°N.

PB 171 809-3 $1.00, $4.00/year

Cryogenic Engineering Lab., National Bureau of Standards, Washington, D. C.
CRYOGENIC MATERIALS DATA HANDBOOK, by T. F. Durham, R. M. McClintock and others. Quarterly rept. on Contract AF 04(647)59-3. Dec 61, 329p. 1106 refs.

DESCRIPTORS: *Cryogenics, Metals, Materials, *Low temperature research, Mechanical properties, Handbooks, Aluminum, Stainless steel, Titanium, Beryllium, Nickel, Copper, Vanadium, Tensile properties, *Guided missiles

See also PB 171 809-2

AD-269 559 repriced $3.00

Lockheed Aircraft Corp., Burbank, Calif.
STUDY ON MINIMIZATION OF FIRE AND EXPLOSION HAZARDS IN ADVANCED FLIGHT VEHICLES, by E. A. Boniface, W. W. Spoecker and others. Final rept. June 60-Aug 61, on Design Criteria for Fire and Explosion Hazards in Advanced Flight Vehicles, Contract AF 33(616)7387. Oct 61, 193p. 165 refs. Lockheed rept. 15156; ASD Technical rept. 61-288.

DESCRIPTORS: *Supersonic planes, Spaceships, Satellite vehicles, Manned, *Aircraft fires, *Aviation safety, Electrical equipment, Aviation fuels, Rocket fuels, Rocket oxidizers, Liquid rocket propellants, Solid rocket propellants, Materials, Hazards, Fires Explosions, Spark ignition, Reliability, Safety, Physiology, *Fire extinguishers, Fire detectors.

A study is presented of potential fire and explosion hazards in advanced flight vehicles and design criteria for enhancement of safety and reliability of the vehicles. The vehicles cover the range between Mach 3 airplanes and long time, long range space vehicles; however, the design criteria may be applied to all flight vehicles as they are currently known to be conceived or built. (Author)

MND-P-2699 $0.75

Martin Marietta Corp., Baltimore, Md.
UPPER ATMOSPHERE RE-ENTRY STUDY: HIGH ALTITUDE BURNUP. VOLUME I. Rept. on Contract AT(30-3)-217. Mar 62, 24p. 14 refs.

PB 156 475 $1.60

Naval Missile [and Astronautics] Center, Point Mugu, Calif.
A CONCEPT OF NON-LINEAR HOMING GUIDANCE FOR POSSIBLE USE IN ASSISTING RECOVERY OF PROBE OR SPACE VEHICLES, by A. Ginn. 11 Apr 61, 16p. Technical memo. no. NMC-TM-60-34.

DESCRIPTORS: *Space probes, Spaceships, *Satellite vehicles, Recovery, Re-entry aerodynamics, Aerodynamics, *Re-entry vehicles, Drag, Nonlinear systems, *Homing devices, Thrust, Tracking, Satellite vehicle trajectories, Targets, Interception, Optical systems.

The concept of a non-linear homing guidance scheme for possible use in the recovery of probe or space vehicles is introduced, and the generalized equations of motion for the system are derived and briefly discussed. Possible methods of mechanizing the system, which involves an on-off type of thrusting of the vehicle, and some accompanying problem areas are discussed. (Author)

PB 156 480 $8.60

Naval Missile [and Astronautics] Center, Point Mugu, Calif.
FLIGHT-TEST EVALUATION OF F9F-6K2 TARGET AIRCRAFT, by R. M. Carter. 10 Apr 61, 96p. Technical memo. no. NMC-TM-61-18.

DESCRIPTORS: *Jet planes, *Aerial targets, *Target drones, Flight testing, Control systems, C-band, S-band, Radar beacons, Telemeter systems, Radar tracking, Phototheodolites, Theodolites, Targets, Aircraft, Guided missiles.

The F9F-6K2 target aircraft is a subsonic jet target aircraft for use in the research, development, and evaluation of guided missiles. The tests show that the

F9F-6K2 has the target service capability of the F9F-6K with the added capabilities of providing 200-foot low-altitude flight; of furnishing the remote-control operator with basic flight information through the in-flight telemetry system; and of furnishing limited S-band and C-band radar augmentation to aid in tracking and controlling the target aircraft.

PB 156 479 $2.60

Naval Missile [and Astronautics] Center, Point Mugu, Calif.
A MISSILE INTERCEPT SIMULATION SYSTEM, by J. D. Fowers and J. R. Bok. 12 Apr 61, 25p. 6 refs. Technical memo. no. NMC-TM-60-64.

DESCRIPTORS: Interception, Simulation, *Guided missiles, *Surface to air, *Air to air, Guided missile warheads, Warheads, Targets, Aircraft.

A missile intercept simulation system (MISS) has been designed and developed at the Naval Missile Center as an aid in evaluation studies of air-to-air and surface-to-air missile armament systems against airborne targets such as aircraft or missiles. Missile/target intercepts and armament performance characteristics are mechanically simulated on the MISS. The function of MISS is to supply data on the armament performance of a specific missile, that otherwise could be obtained only by many flight tests or by extensive analytical studies. (Author)

PB 158 369 $2.60

[Naval Missile and Astronautics Center] Point Mugu, Calif.
A MODEL OF A RECOVERABLE SATELLITE FOR A MONTE CARLO STUDY OF IMPACT DISPERSION, by M. A. Garcia. 22 May 61, 24p. 4 refs. Technical memo. no. PMR-TM-61-7.

DESCRIPTORS: *Satellite vehicles, Motion, *Satellite vehicle trajectories, Recovery, Retro rockets, Rockets, Impact shock, Orbital flight paths, Simulation, Numerical methods and procedures, Impact Computers.

This report presents an analytical model of a recoverable satellite that is mechanized in the Point Mugu IBM 709 computer for the purpose of performing a Monte Carlo analysis of impact point dispersion. This model includes the primary secular perturbations due to the oblateness of the earth, however, approximated for satellites with near-circular orbits. The secular perturbations due to air drag at the perigee are not included; therefore, this model only approximates satellites with near circular orbits that are recovered after a few revolutions when their perigee is low. Air drag is included during the descent phase from an altitude of 100 miles to sea level, and the rotation of the earth's atmospheric envelope is considered. The impact point is defined in terms of an inertial coordinate system and transformed to a rotating coordinate system fixed in the earth. (Author)

PB 159 796 $2.60

Naval [Propellant Plant] Indian Head, Md.
STRAND-BURNING-RATE MEASUREMENTS OVER A WIDE PRESSURE RANGE IN ONE FIRING, by R. W. Sears, Joe L. Browning, and W. W. Robey. 23 Dec 54, declassified 15 Nov 61. 30p. 8 refs. NAVORD rept. no. 3053; Technical rept. no. 82.

DESCRIPTORS: *Propellants, *Combustion, Measurement, Fuels, Pressure, *Solid rocket propellants, Test methods, Test equipment.

A method has been developed whereby strand burning rates may be obtained more rapidly and more economically than by the conventional Crawford method. Samples are burned in a medium of water, rather than nitrogen. The time-consuming process of inhibiting the sample before burning is therefore unnecessary. Pressurization of the system, above a certain minimum pressure determined empirically for each general class of propellants, is accomplished by the gas generated by the burning sample. Pressure, time, and distance burned are recorded by an oscillograph. Average burning rate at average pressure is obtained from this record. Data are presented that illustrate comparable strand-burning-rate curves for three service propellants, obtained by the Crawford and NPF methods. A comparison of day-to-day reproducibility indicates that results obtained by the new method are more reproducible than results ob- by the old method. (Author)

PB 181 172 $5.00

Office of Naval Research, Washington, D. C.
SYMPOSIUM ON DETONATION [NO. 3] JAMES FORRESTAL RESEARCH CENTER, PRINCETON UNIVERSITY. SEPTEMBER 26-28, 1960. [1960] 331p. 155 refs. ONR Symposium rept. ACR-52, vol. 1; AD-242 585.

DESCRIPTORS: *Detonation, *Explosives, Symposia, Explosions, Test equipment, Impact shock, Shock resistance, Pyrolysis, Combustion, Electric currents, Azides, RDX, Pentolite, Electrical conductance, Sensitivity.

Contents: Colliding-ball, high-explosive impact sensitivity testing machine; Photographic study of explosions initiated by impact; Pure environmental shock testing of condensed phases; Memory effect in the thermal initiation of explosives; Thermal decomposition of $[Co(NH_3)_6](N_3)_3$; Behavior of explosives at very high temperatures; Rapid burning of secondary explosives by a convective mechanism; Electrical initiation of RDX; Detonation studies in electric and magnetic fields; Electrical measurements in detonating; Pentolite and Composition B; Electrical conductivity of detonating high explosives; Ionization in the shock initiation of detonation; Chemical factors in external detonation-generated plasmas; Detonation plasma; Energy transfer to a rigid piston under detonation loading; Computer program for the analysis of transient axially symmetric explosion and shock dynamic problems; Pressure profiles in detonating solid explosive:

Decay of explosively induced shock waves in solids and spallings of aluminum; Effects of boundary rarefactions on impulse delivered by explosive charge; Experimental determination of stresses generated by an electric detonator; Comments on hypervelocity wave phenomena in condensed explosives; Nonideal detonation of ammonium nitrate-fuel mixtures. (See also PB 181 173)

PB 181 173 $5.00

Office of Naval Research, Washington, D. C.
SYMPOSIUM ON DETONATION [NO. 3] JAMES FORRESTAL RESEARCH CENTER, PRINCETON UNIVERSITY, SEPTEMBER 26-28, 1960, [1960] 338p. 189 refs. ONR Symposium rept. ACR-52, vol. 2; AD-242 586.

DESCRIPTORS: *Detonation, *Explosives, Impact shock, TNT, PETN, Sensitivity, Shock resistance, Nitroglycerin, RDX, Symposia, Propellants, Test methods.

Contents: Detonation velocity of pressed TNT; Measurements of detonation, shock, and impact pressures; Low-pressure points on the isentropes of several high explosives; Strong shocks in porous media; Behavior of explosives at impulsively induced high rates of strain; Initiation and growth of detonation in liquid explosives; Initiation characteristics of mildly confined, bubble-free nitroglycerin; Shock initiation of detonation in liquid explosives; Shock initiation of solid explosives; Shock-induced sympathetic detonation in solid explosive charges; Growth of detonation from an initiating shock; Initiation of a low-density PETN pressing by a plane shock wave; Transition from shock wave to detonation in 60/40 RDX/TNT; Determination of the shock pressure required to initiate detonation of an acceptor in the shock sensitivity test; Computational treatment of the transition from deflagration to detonation in solids; Method for determination of detonability of propellants and explosives.

SCTM-232-61-81 $0.50

Sandia Corp., Albuquerque, N. Mex.
A METHOD FOR PREDICTING MAXIMUM TEMPERATURES IN WEAPONS DURING STORAGE, by L. N. Dumas. Rept. on Contract AT(29-1)-789. Nov 61, 20p. 19 refs.

Sanitation and Safety Engineering

TID-3303(Suppl. 1) $2.25

Atomic Energy Commission. Div. of Technical Information Extension, Oak Ridge, Tenn.
RADIATION SHIELDS AND SHIELDING, comp. by Henry D. Raleigh. Apr 61, 107p. 687 refs.

CEX-60.5 $0.50

Edgerton, Germeshausen and Grier, Inc., Santa Barbara, Calif.
EXPERIMENTAL EVALUATION OF THE FALLOUT-RADIATION PROTECTION AFFORDED BY A SOUTHWESTERN RESIDENCE, by Z. Burson, D. Parry, and H. Borella. Feb 62, 26p. 12 refs.

AD-269 687 $1.60

National Research Labs., Ottawa (Canada).
A RECORDING HYGROMETER EMPLOYING THERMISTORS, by D. J. Lloyd. Sep 61, 17p. 7 refs. Mechanical Engineering rept. MI-824; NRC no. 6575.

DESCRIPTORS: *Hygrometers, Design, Thermistors, *Forest fires, *Hazards, Measurement, *Humidity, Instrumentation, Recording devices, Humidity sensitive elements.

A description is given of a direct-reading recording hygrometer which is intended as an aid to the assessment of fire hazard in forests. It is capable of unattended operation for a period of one week, is independent of supply mains, and is easily portable. Within the temperature range of +40°F to +100°F, relative humidities from 10 percent to 100 percent are recorded. The accuracy attained is ±3 percent relative humidity, except in a small region defined approximately by temperatures below 50°F and relative humidities below 30 percent, in which errors are rather greater than ±3 percent. (Author)

WT-1513 $0.75

Sandia Corp., Albuquerque, N. Mex.
SURFACE ALPHA MONITORING AS A METHOD OF MEASURING PLUTONIUM FALLOUT, by R. E. Butler and H. M. Miller. Operation Plumbbob - Test group 57, Program 74. 31 Jan 62, 36p.

FOOD, HANDLING, AND PACKAGING EQUIPMENT

AD-257 411 $5.60

Douglas Aircraft Co., Inc., Santa Monica, Calif.
NON-DESTRUCTIVE LEAK TESTING OF SEALED PACKAGES. Final rept. on Contract NOas-60-6037-c. 1 Feb 61, 60p. 14 refs.

DESCRIPTORS: *Packaging, Seals, Tests, *Nondestructive testing, Test methods, Gas diffusion, Instrumentation, Gas leaks, Test equipment, Nonleakage probability, Vacuum pumps, Vacuum systems, Materials, Plastics, Laminates, *Containers, Pressure.

The purpose of the project was to evaluate and make recommendations on feasibility of proposed nondestructive test methods for detection of leaks in sealed packages. Three basic methods were studied. These were: (1) Insertion of a detectable contaminant in packages prior to sealing. (2) Use of a pressure chamber to force a radioactive gas into leaking packages, with subsequent detection of contaminated packages with a scintillation counter. (3) Use of a vacuum chamber to effect detectable expansion of tightly sealed packages. (Author)

PB 159 545 $4.60

Florida State U., Tallahassee.
INVESTIGATION OF THE EFFECT OF EDIBLE EMULSIFIERS AND WETTING AGENTS UPON THE REHYDRATION CHARACTERISTICS OF DEHYDRATED BREAD AND SOFT ROLL PRODUCTS, by E. G. Bayfield, J. M. Kelly and others. Rept. no. 14 (Final), 1 July 56-1 Sep 59, on Contract DA 19-129-qm-614. [1959] 43p. 3 refs. QMFCIAF File no. C-315; AD-237 845.

DESCRIPTORS: *Bread, *Dehydrated substances, Additives, *Colloids, Test methods, Acceptability, Moisture, *Wetting agents, Preservation, Food, Dehydration.

A considerable number of emulsifiers and wetting agents were screened for suitability as bread additives. Firmness of the bread crumb was used as an index of relative degree of staling. It was found that softer bread when dried tended to produce softer bread after the dried product was rehydrated. Most samples were rehydrated in closed containers over a free water surface at a temperature of 60°C. There is no question that bread can be successfully dried and rehydrated back to a condition almost the same as before drying took place. Furthermore, certain of the additives studied definitely improved the process and product. It is felt that drying would be better if the samples moved throughout the drying chamber. This would insure all samples receiving similar conditions of temperature and air velocity. Similarly, a moving rehydration platform in a chamber with a large capacity for generating the desired conditions would be superior to the vessels used in these experiments.

PB 159 471 $7.60

Florida U. Engineering and Industrial Experiment Station, Gainesville.
TRANSIENT ADDITIVES FOR LOW TEMPERATURE PROCESSING OF CANNED MEAT, by S. S. Block, Jean Bevis and others. Rept. no. 5 (Final) 15 Jan 59-14 Apr 60, on Contract DA 19-129-qm-1361. [1960] 71p. QMFCIAF File no. A-331; AD-248 418.

DESCRIPTORS: *Containers, *Meat, Beef, Bacteria, Acetic acids, Acceptability, Food, Additives, Deterioration, Dioxides, Storage, Sulfur dyes, Sulfur compounds, Nitrogen compounds, Oxides, Preservation, Pressure cookers, Processing, Carbon dioxide, Citric acids.

Beef was cooked under mild temperature conditions in atmospheres of CO_2, CO, N_2O, NO, C_2H_5OH, and SO_2. Of these gases, only NO and SO_2 provided any preservation to the meat. The delay in spoilage with NO was not as great as with SO_2. In addition, NO produced an unpleasant odor and color in the meat. Sulfur dioxide was tested in the form of SO_2 gas, sulfurous acid solution, $Na_2S_2O_5$ and Na_2SO_3. A concentration of 500 ppm of SO_2, or greater, was found to give preservation whereas 300 ppm or less did not preserve the beef. In the 300 ppm concentration range, addition of acetic acid to lower the pH by 0.5 unit delayed spoilage but did not prevent it. Likewise, cooking at temperatures up to 215 degrees F rather than 170 degrees F temporarily delayed spoilage. Samples cooked at 175-200 degrees F with SO_2 and stored at 98 degrees F and 115 degrees F have remained preserved for 7 mo. Clostridium sporogenes spores injected into the meat did not spoil beef cooked 20 min at 170 degrees F with 500 ppm of SO_2 as $Na_2S_2O_5$. The spores were not killed by the SO_2 but were prevented from metabolizing. Below 2500 ppm the taste of SO_2 was not detected in the beef. To increase the efficiency of the preservation with SO_2, acetic acid could be added to lower the pH of the beef after cooking to about pH 5.3 without an acid taste being reported. (Author)

PB 158 422 $8.10

Massachusetts Inst. of Tech., Cambridge.
EVALUATION-DEVELOPMENT OF THE CONCURRENT RADIATION DISTILLATION TECHNIQUE AND INACTIVATION OF ENZYMES IN IRRADIATED FOODS, by B. E. Proctor. Rept. no. 12 (Final), 21 Apr 57-30 Apr 59, on Contract DA 19-129-qm-905. [1959] 90p. 29 refs. QMFCIAF File no. S-501; AD-239 539.

DESCRIPTORS: *Food, *Enzymes, *Radiation effects, Inhibition, Test equipment, Dose rate, Design, Storage, *Milk, *Beef, *Meat, Acceptability, Carbonyl radicals, Sulfur compounds, Chromatographic analysis.

A radiation-distillation apparatus which permits the use of high dose rates by means of high energy electrons was designed and constructed. This provided flexibility of manipulation and widened the practical application of the radiation-distillation technique. The concurrent radiation-distillation apparatus was further improved by modifications which allow isolation of volatile components produced during radiation-distillation. The concurrent radiation-distillation technique was used as a research tool for characterizing the volatile flavor compounds from irradiated beef slurries and from milk. Whenever possible, the volatile compounds considered to be of significance to taste and odor were trapped and examined chemically. The effect of process variables on the storage qualities (browning and gelation) of radiation-sterilized milk was studied. Investigation of conditions necessary to accomplish inactivation of proteolytic enzymes in beef muscle was conducted. (Author)

PB 159 543 $3.60

Minnesota U., St. Paul.
A STUDY OF THE ROLE OF LIPIDS IN WHEAT FLOUR DETERIORATION. Rept. no. 5 (Final), 11 Dec 56-1 Dec 59, on Contract DA 19-129-qm-813. [1959] 33p. QMFCIAF File no. C-306; AD-242 906.

DESCRIPTORS: *Flour, Deterioration, *Lipids, Wheat, *Fats, Chemical reactions, Butanols.

A study was made to elucidate the role in flour deterioration of the diethyl ether-extractable fraction of flour and the fraction of flour further extracted by water saturated 1-butanol. Results indicate that: (1) the extraction and reconstitution techniques used in these studies did not alter the baking quality or increase the fat acidity of the flours studied; (2) the deterioration of flour baking quality is not due to changes occurring in the diethyl ether-extractable portion of flour; (3) hydrolysis and/or oxidation of the diethyl ether-extractable material in flour causes an initial decrease in bread baking quality but does not effect the normal rate of deterioration; (4) the increase in fat acidity in a flour is positively correlated with a loss of baking quality but is not directly involved in causing the decrease in baking quality; (5) the extraction of a flour with water saturated 1-butanol harms the baking quality of the flour but this is not an effect of the loss of lipid per se since adding back the lipid so extracted does not restore the baking quality of the flour; (6) addition of water saturated 1-butanol extractable material at a high concentration does not cause an appreciable change in the rate of flour baking quality deterioration as measured by loaf volume values; and (7) the addition of butanol extractables in some way reduces the titratable acidity development in a deteriorating flour. (Author)

PB 159 544 $2.60

Nebraska U. Coll. of Agriculture, Lincoln.
A STUDY OF THE INTERACTION OF LIPIDS AND STARCH DURING THE STORAGE DETERIORATION OF WHEAT FLOUR, by R. M. Sandstedt, Paul J. Mattern, and Anne Kelly. Rept. no. 13 (Final) 1 July 57-30 June 59, on Contract DA 19-129-qm-892. [1959] 24p. 3 refs. QMFCIAF File no. C-314; AD-236 804.

DESCRIPTORS: *Lipids, Phospholipids, *Starches, *Flour, Bread, Fatty acids, Storage, Deterioration, Aging, Food.

Starch washed from flours that had been stored for prolonged periods at relatively high temperatures (40°C) gave inferior baking characteristics to doughs reconstituted from a combination of the starch with a good baking gluten. The detrimental effects were more notable on air dried than on lyophilized starches Rewetting and drying the starches caused poorer baking results. Extraction with petroleum ether of the starches damaged by storage intensified the damage. Shortening in the baking formula eliminated much of the difference between starches from flours stored at low and high temperatures. Lipid extracted from flour after storage at 40°C for one year when added to a starch with good baking properties was exceedingly detrimental. The detrimental effects became more pronounced with increasing time between the time of adding the lipid and the baking. Extracting the starch containing the aged lipid with petroleum ether partially restored the original baking properties. Rewashing the "aged lipid starch" from a reconstituted dough resulted in considerable improvement in baking properties. Fatty acids added to the starch were likewise deterimental. Time of contact between the starch and fatty acid increased the damaging effects, The tentative conclusion from this research is that a fatty acid-starch complex is responsible for the poor baking properties of starch from aged flour. (Author)

MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT

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D 103.8:41

Board of Engineers for Rivers and Harbors, Washington, D. C.
THE PORT OF BUFFALO, NEW YORK, PART 2. Rev. 1960, 1961. 61p. Port Series no. 41.

DESCRIPTORS: *Harbors, *Piers, Floating docks, Storage, Warehouses, New York

Contents:
Port and harbor conditions
Port and harbor facilities
List of piers, wharves, and docks
List of storage warehouses

PB 159 685 $2.60

General Electric Co., Schenectady, N. Y.
OBSERVATIONS ON THE PERFORMANCE OF SELF-ACTING GAS JOURNAL BEARINGS, by Richard Elwell. Rept. on Contract Nonr-2844(00). 3 Mar 61, 27p. 13 refs. AD-253 820.

DESCRIPTORS: *Gas bearings, Journal bearings, Bearings, Theory, Stability, Moisture, Condensation, Mechanics, Tests.

The first part of the report discusses a new theory for the occurrence of the phenomenon of half-frequency whirl in plain journal bearings. This instability is one of the most serious problems in the application of these bearings today. An evaluation of the stability of these bearings is presented on the basis of different forms of energy contained within the gas film. The objective of this analysis is to furnish a simple, easy-to-use, method of predicting the threshold of this destructive instability. Means can then be provided for raising this inception speed above the operating range of the equipment. As such, it is subject to simplifying assumptions which limit its accuracy of calculation in some circumstances. Nevertheless, in the comparisons which are carried out with the scant data available, the results are consistent with most experimental observations. Part II of the report presents the results of an experimental investigation of moisture condensation in the gas film of bearings under a rotating unbalance load (synchronous whirl). Wide variations in relative humidity, L/D ratio, load, and speed, were employed. The results, though coarse, show a consistent effect due to the ratio of bearing load to ambient pressure. (Author)

PB 159 835 $4.60

Army Ballistic Missile Agency, Huntsville, Ala.
RAMJET PRELIMINARY DESIGN: A RAPID, ACCURATE GRAPHICAL METHOD, by C. C. E. Hoehich. 23 Aug 60, 46p. 5 refs. Rept. no. RA-TR-1-60; AD-242 472.

DESCRIPTORS: *Ramjet engines, Jet engines, Design, Thrust, Fuel consumption, Supersonics, Mathematical analysis.

The theoretical performance analysis and design of a ramjet system require laborious calculations, especially for off-design performance. This report attempts to present a simple, accurate graphical approach which facilitates sizing and determines thrust and fuel consumption for any solid or liquid chemical fuel. This method makes use of graphs and correction factors for fuel addition, molecular weight change, expansion over the simple converging nozzle case, and altitude change. This set of curves covers the Mach number range from 1.2 to 2.8 and altitudes from sea level to 100,000 feet. This report also includes an example problem which illustrates this method. (Author)

APEX-656 $0.50

General Electric Co., Cincinnati, Ohio.
PRE-TEST PREDICTIONS, by T. E. Sicking. Rept. on Contracts AF 33(600)38062 and AT(11-1)-171. 31 Aug 61, 5p.

APEX-911 $6.60

General Electric Co., Cincinnati, Ohio.
REMOTE HANDLING, by R. F. Morand. Rept. on Contracts AF 33(600)-38062 and AT(11-1)-171. 13 Dec 61, 66p. 4 refs.

MND-P-2613 $1.25

Martin Co., Baltimore, Md.
FINAL SAFETY ANALYSIS; TEN-WATT STRONTIUM-90 FUELED GENERATOR FOR AN UNATTENDED LIGHT BUOY: SNAP-7A. Rept. on Contract AT(30-3)-217. Feb 62, 49p. 3 refs.

MND-P-2614 $1.25

Martin Co., Baltimore, Md.
FINAL SAFETY ANALYSIS; TEN-WATT STRONTIUM-90 FUELED GENERATOR FOR AN UNATTENDED METEOROLOGICAL STATION: SNAP-7C. Rept. on Contract AT(30-3)-217. Feb 62, 49p. 20 refs.

AD-260 736 $2.60

Carnegie Inst. of Tech. Graduate School of Industrial Administration, Pittsburgh, Pa.
NOTE ON TRANSIENT PATTERNS IN COSTS AND ASPIRATIONS, by W. W. Cooper and J. D. Savvas. ONR Research memo. no. 83, on Planning and Control of Industrial Operations, Contract Nonr-760(01). May 61, 23p. 16 refs.

DESCRIPTORS: *Management engineering, Needs, Costs, Economics, Theory, Mathematical analysis, Psychology, Applied psychology.

Contents:
Budget control and cost behavior
Models without Stedry pressures
The principle of exceptions case
Stedry pressure variations

PB 159 730 $2.60

Carnegie Inst. of Tech. Graduate School of Industrial Administration, Pittsburgh, Pa.
SOME IMPLICATIONS OF THE NEWER ANALYTIC APPROACHES TO MANAGEMENT, by W. W. Cooper. ONR Research memo. no. 78 on Planning and Control of Industrial Operations, Contract Nonr-760(01). 19 Jan 61, 27p. 25 refs. AD-252 179.

DESCRIPTORS: *Management engineering, Theory, Programming, Scientific research, Control, Games theory, Mathematics, Computers, Operations research, Automation, Economics.

Contents:
Newer analytical techniques and underlying relations between management and science
Management functions and management mathematics
The area of control
Management and the organization man.

PB 159 781 $2.60

Statistical Lab., Iowa State U. of Science and Tech. [Ames.]
THE METHOD OF PARALLEL TANGENTS (PARTAN) FOR FINDING AN OPTIMUM, by B. V. Shah, R. J. Buehler, and O. Kempthorne. Technical rept. no. 2 on Contract Nonr-530(05). Apr 61, 25p 25 refs. AD-254 596.

DESCRIPTORS: *Operations research, *Statistical analysis, Mathematics, Mathematical analysis, Algebraic geometry, Numerical methods and procedures

Contents:
Partan in two dimensions
The general partan algorithm and theorem
Geometrical proof
Analytic proof

Notation
Equations determined by the construction
General proof by induction
Related earlier work
Special cases of the general algorithm
Steepest ascent partan
Scale-invariant partan
Applications in numerical analysis
Applications in experimental design

PB 159 779 $4.60

Statistical Lab., Iowa State U. of Science and Tech. [Ames].
SOME PROPERTIES OF STEEPEST ASCENT AND RELATED PROCEDURES FOR FINDING OPTIMUM CONDITIONS, by R. J. Buehler, B. V Shah, and O. Kempthorne. Technical rept. no. 1 on Contract Nonr-530(05). Apr 61, 47p. 20 refs. AD-254 595.

DESCRIPTORS: *Operations research, Production, *Statistical analysis, Mathematical analysis, Numerical methods and procedures, Mathematics, Partial differential equations.

The problem is considered of determining the values of input variables x which maximize a response phi. In the known techniques of steepest ascent and one factor at a time a path leading to successively higher responses is followed, the direction of each path segment being determined from knowledge of the first derivatives of phi. For these methods and for other similar methods the success of a single step has been measured by the ratio rho of the increase in phi which it produces to the greatest possible increase. For a particular response phi, the dependence of rho upon the starting point can be averaged out by considering a uniform distribution of starting points. In this way, various rules for determining the path direction can be compared. Although steepest ascent is not uniformly superior to the alternatives we have considered it does hold its own fairly well against the competitors (Author)

PB 159 780 $1.10

Statistical Lab., Iowa State U. of Science and Tech. [Ames].
STEEPEST ASCENT PARTAN ON ELLIPSOIDAL CONTOURS, by R. J. Buehler, B. V. Shah, and O. Kempthorne. Technical rept. no. 3 on Contract Nonr-530(05). Apr 61, 8p. 4 refs. AD-254 597.

DESCRIPTORS: *Operations research, *Statistical analysis, Mathematics, Numerical methods and procedures, Mathematical analysis.

Some details are presented (with proofs merely indicated) of the performance of the special method of steepest ascent partan, as used to determine the minimum (or maximum) of a quadratic function phi.

PB 159 728 $2.60

California U., Los Angeles.
SIMULATION OF QUEUES WITH DYNAMIC PRIORITIES, by James R. Jackson. Rept. on Management Sciences Research Project, Contract Nonr-233(02, 20 Mar 61, 28p. 7 refs. Research rept. no. 71; AD-254 765.

DESCRIPTORS: *Operations research, Simulation, Digital computers, *Probability.

Computer simulation studies of queues are reported in which service order is governed by due-date-like priorities. The main results are in the form of conjectures about the upper tails of the waiting-time distributions. Pertinent mathematical research is mentioned. (Author)

AD-255 699 repriced $0.75

Institute of Science and Tech., U. of Michigan, Ann Arbor.
OPTICAL MATERIALS FOR INFRARED INSTRUMENTATION, by Stanley S. Ballard, Kathryn A. McCarthy, and William L. Wolfe. Rept. on IRIA State-of-the-Art, Contract Nonr-1224(12). Apr 61, 29p. 39 refs. Rept. no. 2389-11-Sl; Suppl. to rept. no. 2389-11-S, PB 181 087.

DESCRIPTORS: *Infrared optical materials, Instrumentation, *Optical materials, Optical instruments, Refractive index, Optical glass, Crystals, Ceramic materials, Optics, Infrared equipment, Physical properties, Electrical properties, Mechanical properties, Materials.

Additional data are compiled on the optical materials, which are useful for infrared instrumentation, treated in 2389-11-S, as well as data on three new materials, Irtran-1, Irtran-2, and diamond. In addition, several errors and ambiguities in the original report are corrected and clarified. (Author)

PB 159 832 $3.60

Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
PHYSICAL CHARACTERISTICS OF SOME RESILIENT MATERIALS, by Philip J. Kaminsky. Rept. on Contract AF 04(647)305. 12 Dec 60, 39p. Technical memo. RAD-9-TM-60-58; AD-248 800.

DESCRIPTORS: *Physical properties, Hardness, *Vibration isolators, Guided missiles, Tests, Density, Elasticity, Impact shock, Sponges, Vinyl radicals, Synthetic rubber, Urethanes, Surface to surface, Load distribution, Polymers.

Some static and dynamic physical characteristics of 22 types of resilient materials were investigated. The resilient materials which were investigated were synthetic rubbers and sponges, Polyvinyls, Neoprenes and Polyurethanes. Each sample material was cut into square test specimens, two inches on a side, with the thickness being that of the parent material. Some of the materials had open-cell construction while others had closed-cells; some had no visible cells at all. The manufacturer or identification of most of these materials was known but in a few cases it was unknown. Force-Deflection curves were plotted for temperatures of 77 F and 145 F and a determination of density, hardness on the Shore Durometer scale, compression proportional limit and elastic modulus were made. Using the shock excitation method and the resulting vibration decay curves, damping factors were also determined for each material. This information should be valuable in the determination of the proper materials to be used when designing shock and vibration isolation systems. (Author)

PB 159 821 $14.50

Textile Research Inst., Princeton, N. J.
DYNAMIC ANALYSIS OF COPLANAR CRIMPED ELASTIC FILAMENTS, by William Denney Freeston, Jr. Technical rept. no. 21 on Contracts Nonr-09000 and Nonr-09001. Apr 61, 219p. 27 refs. AD-254 669.

DESCRIPTORS: *Filaments, Shear stresses, Analysis, *Motion, Equations, Vibration, Mathematical analysis, Differential equations, Deflection, Digital computers, Programming, *Dynamics, Elasticity, *Applied mechanics, *Mechanics, Textiles, Numerical analysis, Partial differential equations, Theory, Non-linear differential equations.

The governing differential equation of motion of a coplanar filament with arbitrary initial configuration is derived and solved, considering the effect of bending only. The results for the first three modes of vibration of a filament with both ends clamped are presented on a plot of curvature multiplied by total filament length versus a frequency factor Z. A comparison of these results with experiment is made. A set of equations for calculating the natural frequencies of a multi-span, simply supported, crimped filament is derived. A set of two governing differential equations of motion of a coplanar filament with arbitrary initial configuration is derived, considering the effects of bending and stretching. A general method of solution of the two nonlinear partial differential equations of motion is outlined. (Author)

Ceramics and Refractories

NYO-10005 $0.50

Aeroprojects Inc., West Chester, Pa.
APPLICATION OF ULTRASONIC VIBRATION TO COLD PRESSING OF CERAMIC PELLETS, by William B. Tarpley and Herbert Kartluke. Rept. on Contract AT(30-1)-1836. Nov 61, 17p. 9 refs.

NYO-10006 $1.50

Aeroprojects, Inc., West Chester, Pa.
ULTRASONIC EXTRUSION: REDUCTION IN VEHICLE AND PLASTICIZER REQUIREMENTS FOR NON-CLAY·CERAMICS, by William B. Tarpley, Kenneth H. Yocom, and Richard Pheasant. Rept. on Contract AT(30-1)-1836. Nov 61, 66p. 31 refs.

NAA-SR-6493 $0.75

Atomics International, Canoga Park, Calif.
OXIDATION KINETICS OF $ZrBe_{13}$ AND $NbBe_{12}$, by G. Ervin, Jr. and M. M. Nakata. Rept. on Contract AT(11-1)-GEN-8. 15 Mar 62, 31p. 18 refs.

APEX-684 $1.00

General Electric Co., Cincinnati, Ohio
BASIC MATERIALS STUDIES SINTERABLE HIGH PURITY BeO, by W. J. Kirkpatrick, G. R. Anderson, and E. S. Funston. Final rept. on Contracts AF 33(600)-38062 and AT(11-1)-171. Dec 61, 43p. 23 refs.

PB 159 558 $9.60

Imperial Glass Corp., Bellaire, Ohio.
DEVELOPMENT WORK ON IMPROVED HIGH MODULUS STRUCTURAL GLASS FIBER, by R. R. Bastian and Axel Ottoson. Final rept. Nov 54-30 June 57, on Contract NOas-55-213-c. [1957] 114p. 2 refs. AD-207 884.

DESCRIPTORS: Glass, *Glass textiles, Processing, Physical properties, Elasticity, Statics, Dynamics, Melting, Density, Measurement, Microanalysis, Rods, Ceramic materials, Materials

Equipment was set up to measure Young's modulus of elasticity for coarse fibers by a static method and fine fibers by a dynamic method. Continuing studies of the effect of composition on Young's modulus, the melting point, and devitrification were made and recorded. Single fibers were drawn from the more promising compositions from the one hole bushing. The most promising glasses were melted in volume and checked for attenuation characteristics in the 48 hole bushing at drawing speeds of 6000 to 7500 lineal feet per minute. (Author)

Fuels, Lubricants, and Hydraulic Fluids

PB 159 794 $2.60

Aberdeen Proving Ground, Md.
DEVELOPMENT OF AN ANALYTICAL PROCEDURE FOR THE IDENTIFICATION OF INHIBITORS FOUND IN HYDRAULIC BRAKE FLUIDS, by R. P. Witt, Charles F. Pickett, and Charles B. Jordan. Rept. no. 7, on Hydraulic Brake Fluid, Non-Mineral Chemical Analysis, Standby Storage Tests Project TB5-5010F, phase 1. 20 Jan 50, 22p. 11 refs. Lab Service Div. rept. no. 96.

DESCRIPTORS: *Hydraulic brakes, *Hydraulic fluids, *Corrosion inhibition, Identification, Chemical analysis.

Inhibitors found in brake fluids may be organic (ex. N-phenyl morpholine), inorganic (ex. borax), metal organic (ex. sodium stearate), or organic salts (ex. n-amylamine phosphate). Any of these may be identified by the procedure outlined herein. (Author)

PB 159 795 $2.60

Aberdeen Proving Ground, Md.
TEST OF HYDRAULIC FLUIDS FOR RECOIL AND HYDRAULIC MECHANISM, HYDRAULIC BRAKES, POWER TRANSMITTING FLUIDS, by C. B. Jordan, C. F. Pickett, and R. P. Witt. Rept. no. 29, on Study of Corrosion Inhibitors and Antioxidants for Glycols, Project no. TB5-5010F. 3 Nov 54, 22p. 5 refs. Lab. Service Div. rept. no. 228.

DESCRIPTORS: *Hydraulic fluids, *Hydraulic brakes, *Corrosion inhibition, Ethylenes, Glycols

Several combinations of chemicals have been found which satisfactorily inhibit the glycols. The most difficult metals to protect against corrosion caused by ethylene glycol are tin, steel, and cast iron. Copper and brass may be protected by any of several inhibitor used. Aluminum is seldom deleteriously affected by ethylene glycol regardless of the inhibitor used. In general 1, 2-propylene glycol does not cause as much corrosion as ethylene glycol, although the corrosion characteristics of the two glycols are similar. (Author)

PB 181 174 $0.75

Coating and Chemical Lab., Aberdeen Proving Ground, Md.
IMPROVED MULTIPURPOSE CORROSION INHIBITOR, by Charles B. Jordan, 15 Jan 62, 21p. 7 refs. Rept. no. CCL #113.

DESCRIPTORS: Hydraulic brakes, *Hydraulic fluids, Coolants, Freezing point depressants, Stability, Storage, Preservation, *Corrosion inhibition, Antioxidants, Acetylene derivatives, Propenes, Glycols, Borax, Tests.

This study deals with the development of a corrosion inhibitor for an all-weather brake fluid, which enhances stability and storage properties of the fluid. A number of standard antioxidants and a new series of acetylenic derivatives were evaluated. The most effective of these, 2-butyne-1, 4-diol was utilized to form a double condensate with 1, 2-propylene glycol and borax. The highly desirable properties of this condensate are discussed. These properties include excellent corrosion inhibition in brake fluids and coolants, improved stability and storage properties, increased boiling point, good rubber compatibility, and solubility in all current brake fluid and antifreeze media. (Author)

APEX-672 $1.50

General Electric Co., Cincinnati, Ohio.
HIGH TEMPERATURE LUBRICATION STUDY, by E. Häffner, P. Lewis and others. Rept. on Contracts AF 33(600)-38062 and AT(11-1)-171. Dec 61, 61p. 45 refs.

AD-268 201 repriced $2.00

Little, Arthur D., Inc., Cambridge, Mass.
STORAGE, SERVICING, TRANSFER, AND HANDLING OF HYDROGEN, by A. W. Adkins, L. A. Black and others. Rept. 11 Apr 60-30 Apr 61, on Contract AF 33(616)7330, continuation of Contract AF 33(616)5641. May 61, 73p. 26 refs. AFFTC Technical rept. 61-18.

DESCRIPTORS: *Hydrogen, Liquefied gases, Storage, Handling, Transportation, Hazards, Vaporization, Gas cylinders, Containers, Storage tanks, Pressure vessels, Pumps, Vacuum systems, Design, Pressure, Reliability, Stresses, Thermal stresses, Heat transfer, Tests, *Handbook, Data.

Contents:
Liquid hydrogen pumps
Pressurized transfer of liquid hydrogen with hydrogen gas
Requirements for hydrogen gas storage cylinders used for the pressurized transfer of liquid hydrogen
The transfer of liquid hydrogen using vaporizers
Economic comparison of various means for transferring liquid hydrogen
Development of a coupling for a vacuum-jacketed line

PB 159 739 $1.60

Princeton U., N. J.
BURNING RATE CONTROL FACTORS IN SOLID PROPELLANTS, by Kimball P. Hall and E. Karl Bastress. Quarterly technical summary rept. no. 8, 1 Oct-31 Dec 60, on Contract Nonr-1858(32). 15 Mar 61, 15p. 3 refs. Aeronautical Engineering rept. no. 446-h; ARPA Order nos. 23-59, 23-60, Amend. 5; AD-253 438.

DESCRIPTORS: *Solid rocket propellants, Ball mills, Combustion, Particles, Hammers, *Propellant grains, Ammonium radicals *Perchlorates, Grinders, Rocket oxidizers.

A study was made of the grinding characteristics of ammonium perchlorate in a Bantam Mikro-Pulverizer hammer mill. In this device, size reduction is accomplished by impact of the particles with the hammers rotating at high speed. Particles rebound from the walls of the mill and are repeatedly struck by the hammer until they manage to escape through a screen at the bottom into a collecting bag. Four factors affect the particle distribution of the ground material; (1) hammer speed, (2) feedscrew speed, (3) screen mesh opening and (4) the number of times the material is passed through the feeder.

PB 159 740 $11.50

Princeton U., N. J.
MODIFICATION OF THE BURNING RATES OF AMMONIUM PERCHLORATE SOLID PROPELLANTS BY PARTICLE SIZE CONTROL, by E. Karl Bastress. Technical rept. on Contract Nonr-1858(32). 13 Mar 61, 155p. 48 refs. Aeronautical Engineering rept. no. 536; AD-254 169.

DESCRIPTORS: *Solid rocket propellants, Combustion Propellant grains, Particles, Ammonium radicals, Perchlorates, Polymers, Rocket oxidizers, Sulfides, Measurement, Pressure.

The steady state combustion of composite solid propellants was investigated. The following major results and conclusions were obtained. (1) The burning rates of ammonium perchlorate composite propellants in general are sensitive to the particle size distribution of the oxidizer. (2) The mechanism of propellant combustion is found to change with changing pressure and particle size. At very low pressures and with fine particles the controlling mechanism appears to be the gas phase chemical reaction. At intermediate pressures the process is controlled by diffusional mixing in accordance with the granular diffusion flame theory. At high pressures, propellant combustion is dominated by the decomposition of the perchlorate. (3) In some propellants the transition between the latter two regions mentioned in (2) is accompanied by plateau burning. and (4) Some of the results were utilized to predict the effects of increased propellant performance on the boundaries of the regions of combustion. (Author)

MATHEMATICS

PB 159 729 $2.60

California U., Loss Angeles.
POINT OF VIEW, SCIENTIFIC THEORIES AND ECONOMETRIC MODELS, by Robert J. Wolfson. Rept. on Management Sciences Research Project, Contract Nonr-233(02). 20 Mar 61, 23p. 11 refs. Discussion paper no. 77; AD-254 764.

DESCRIPTORS: *Theory, Mathematical analysis, Numerical methods and procedures, Economics, Numerical analysis.

AD-259 837 $3.60

Carnegie Inst. of Tech. Graduate School of Industrial Administration, Pittsburgh, Pa.
A MODEL OF MULTI-PERIOD INVESTMENT UNDER UNCERTAINTY, by Bertil Naslund and Andrew Whinston. ONR Research memo. no. 82 on Planning and Control of Industrial Operations, Contract Nonr-760(01). 20 Mar 61, 38p. 20 refs.

DESCRIPTORS: *Information theory, *Operations research, Industry, Operations, Mathematical predictions, *Probability, Mathematical analysis, Reasoning, Commerce, Economics, Theory.

This paper explores rational decision making for investment in the stock market. The first part is concerned with problems of a methodological nature, mainly dealing with the relationship between normative models and operations research. The major part explores a particular model and the various features the model possesses. The interpretation and use of a dual prices in a stochastic programming model is discussed. The final part will suggest various possible extensions into other areas. (Author)

AD-259 838 $1.60 Not announced by ASTIA

Columbia U., New York.
A NEW APPROACH TO A CLASSICAL STATISTICAL DECISION PROBLEM, by Herbert Robbins. Rept. on Contract Nonr-266(59). 26 June 61, 14p. 4 refs. CU-25-61-Nonr-266(59)MS.

DESCRIPTORS: *Statistical analysis, Statistical functions, Probability, Sequential analysis.

A new way is presented of looking at the old problem of testing a simple statistical hypothesis against a simple alternative when the problem is assumed to occur not once but repeatedly. The result seems interesting both from the point of view of the foundations of statistical inference and for its usefulness in practical situations. (Author)

PB 159 816 $7.60

Cornell U., Ithaca, N. Y.
INVARIANTS FOR EFFECTIVE HOMOTOPY CLASSIFICATION AND EXTENSION OF MAPPINGS, by Paul Olum. Rept. on Contract Nonr-401(20). [1961] 72p. 21 refs. AD-254 327.

DESCRIPTORS: *Algebraic topology, *Topology, Mapping.

PB 159 818 $2.60

Cornell U., Ithaca, N. Y.
THE GENERALIZED WHITEHEAD PRODUCT, by Martin Arkowitz. Rept. on Contract Nonr-401(20). [1961] 21p. 7 refs. AD-254 307.

DESCRIPTORS: *Mathematics, *Topology, Groups (Mathematics).

Proof is presented that two generalized Whitehead products coincide, thereby generalizing a result of Samelson's (Amer. Journ. of Math. 75:744-752, 1953). Secondly, it is shown how the standard properties of Whitehead products are easily derived for generalized Whitehead products by means of the first definition (The first definition is closely related to a commutator of group elements). In particular, the Jacobi identity is proved for the generalized Whitehead product by generalizing and slightly modifying G. W. Whitehead's argument.

PB 159 819 $3.60

Cornell U., Ithaca, N. Y.
ON A GENERALIZATION OF NILPOTENCY TO C. S. S. COMPLEXES, by P. J. Hilton. Rept. on Contract Nonr-401(20). [1961] 34p. 9 refs. AD-254 306.

DESCRIPTORS: *Algebraic topology, Analysis.

PB 159 815 $3.60

Cornell U., Ithaca, N. Y.
OPERATORS AND COOPERATORS IN HOMOTOPY THEORY, by P. J. Hilton. Rept. on Contract Nonr-401(20). [1961] 38p. 6 refs. AD-254 309.

DESCRIPTORS: *Algebraic topology, Mapping, Operators (Mathematics).

PB 159 817 $1.10

Cornell U., Ithaca, N. Y.
REMARK ON FREE PRODUCTS OF GROUPS, by P. J. Hilton. Rept. on Contract Nonr-401(20). [1961] 16p. 4 refs. AD-254 308.

DESCRIPTORS: *Mathematics, *Topology, Groups (Mathematics).

G. W. Whitehead's question of finding, in some sense, a dual of Lusternik-Schnirelmann category for topological spaces is treated. This question is particularly concerned with a numerical invariant k to be attached to a space such that the spaces with k is less than or equal to 2 are just those admitting multiplications. It appears convenient to seek such an invariant in the category of c. s. s. complexes by utilizing Kan's loop-functor G which passes to the category of group complexes. This has required an investigation of certain properties of free products of groups deemed worthwhile extracting from the general body of the investigation and presenting separately; in this investigation it is indicated briefly what these are. (Author)

AD-261 538 $2.60

Northwestern Technological Inst., Evanston, Ill.
CONSTRAINED GENERALIZED MEDIANS AND LINEAR PROGRAMMING UNDER UNCERTAINTY, by A. Charnes, W. W. Cooper, and G. L. Thompson. ONR Research memo. no. 41 on Temporal Planning and Management Decision under Risk and Uncertainty, Contract Nonr-1228(10) and Planning and Control of Industrial Operations, Contract Nonr-760(01). 6 July 61, 27p. 35 refs.

DESCRIPTORS: *Linear programming, *Scheduling, Statistical distributions, Statistical analysis, Matrix algebra.

The uncertainty interpretation for linear programming problems refers to what is supposed to be a staged optimization by reference to the resulting expected values of suitably specified criterion elements. This interpreted mode of attack rather naturally suggested to Dr. Dantzig (management Science I, 3-4:197-206, 1955) that the optimizing emphasis for linear programming under uncertainty should probably be directed towards the means of the relevant statistical distributions. The emphasis in Dantzig's own formulations requires an orientation towards the medians rather than the means (or modes) as he had supposed. Also, an exclusive emphasis on staging does not provide a wholly adequate characterization of this linear programming under uncertainty, since suitable algebraic developments and substitutions can be used to turn Dantzig's multi-stage problems into one-stage ordinary minimization problems.

PB 159 782 $1.10

Statistics Center, Rutgers State U., New Brunswick, Conn.
SOME APPLICATIONS OF TCHEBYCHEV'S INEQUALITY TO ANALYSIS, by Roger S. Pinkham. Technical rept. no. N-5 on Contract Nonr-404(06). Apr 61, 8p. 5 refs. AD-254 874.

DESCRIPTORS: *Probability, *Statistical analysis, Statistical processes, *Inequalitites, Mathematics

PB 159 733 $5.60

Washington U., Seattle.
COMPUTATIONS INVOLVING INVERSES, by Paul Horst. Rept. on Contract Nonr-477(08) and Public Health Research Grant M-743(C5). Feb 61, 56p. AD-252 254.

DESCRIPTORS: *Matrix algebra, Instruction manuals, Errors, Analysis, *Mathematical prediction.

This analysis is in a proposed series detailing the elementary matrix notation and operations which are the foundation of our multiple prediction research as well as most other multivariate analysis designs. (Author)

Computing Devices

AD-269 542 repriced $1.25

Catholic U. of America, Washington, D. C.
FERRIELECTRICS AS A POSSIBLE COMPUTER ELEMENT, by Charles F. Pulvari. Rept. on Contract AF 33(616)7423. Oct 61, 42p. 8 refs. ASD Technical rept. 61-331.

DESCRIPTORS: *Ferroelectric materials, Electrical properties, High temperature research, Switching circuits, Computer logic, Tests, Non-destructive testing, Polarization, *Digital computers, *Memory devices.

Research on high temperature ferroelectric storage media led to the discovery of a class of ferroelectric materials which require a minimum threshold field for

switching. This property was heretofore not observed in ordinary ferroelectrics and compares with similar properties found in ferrite cores. Work was conducted essentially to exploit the phenomenon of ferrielectricity for application in computer logical devices. The feasibility of preparing capacitors having a ferrielectric as a dielectric was investigated. Limiting electrical parameters of the device were determined. Finally, a novel non-destructive readout method was investigated using electromagnetic interferometer techniques. With the experimental device constructed the best signal-to-noise ratio obtained was 6:1. It is possible to obtain millions of readouts from a ferroelectric capacitor without destroying the state of polarization of the ferroelectric capacitor. (Author)

PB 157 804-8 $4.60

Digital Systems Lab., Princeton U., N. J.
CONTROL UNITS FOR SEQUENCING COMPLEX ASYNCHRONOUS OPERATION, by A. Grasselli. May 61, 46p. 4 refs. Technical rept. no. 8.

DESCRIPTORS: *Digital computers, Computers, *Control systems, Synthesis, Sequence switches, Circuits, Computer logic, Matrix algebra, Algebra.

Sequential circuits techniques for the synthesis of digital computer control units are investigated. The assumption is made that the operations to be controlled are complex sequences of asynchronous events linked by precedence relations. An algorithm for the synthesis of the control unit flow-table from the list of precedence relations is given. (Author)

PB 157 804-10 $1.60

Digital Systems Lab., Princeton U., N. J.
THE DESIGN OF PROGRAM-MODIFIABLE MICRO-PROGRAMMED CONTROL UNITS, by A. Grasselli. May 61, 18p. 3 refs. Technical rept. no. 10.

DESCRIPTORS: *Digital computers, Computers, Programming, *Control systems, Memory devices, Design.

Many computer applications require a control structure which can be easily modified to achieve optimum processing time. A program-modifiable control unit of new design is described here. (Author)

PB 157 804-1 $3.60

Digital Systems Lab., Princeton U., N. J.
AN ESSAY ON PRIME IMPLICANT TABLES, by I. B. Pyne and E. J. McCluskey, Jr. Oct 60, 37p. 11 refs. Technical rept. no. 1.

DESCRIPTORS: *Digital computers, Computers, Computer logic, *Special functions, Algebra, *Matrix algebra, *Linear programming, Games theory, Scheduling.

PB 157 804-3 $1.60

Digital Systems Lab., Princeton U., N. J.
INTRODUCTION TO STATE TABLES, by E. J. McCluskey, Jr. Feb 61, 18p. 1 ref. Technical rept. no. 3.

DESCRIPTORS: *Digital computers, Computers, Computer logic, Circuits, *Electrical networks, Sequence switches, Analysis, Memory devices, Switching circuits, Synthesis.

This paper presents the state table technique for analyzing sequential circuits. The discussion is carried out for circuits operating with d.c. inputs and using Set-Reset flip-flops as storage elements. A "running example" is used to illustrate the general techniques presented. (Author)

PB 157 804-7 $3.60

Digital Systems Lab., Princeton U., N. J.
MEMORY AND CYCLING IN BILATERAL ITERATIVE NETWORKS, by J. F. Poage. May 61, 31p. 2 refs. Technical rept. no. 7.

DESCRIPTORS: *Digital computers, Computers, *Electrical networks, Circuits, Memory, *Memory devices, Switching circuits, Computer logic, *Scheduling.

A few of the properties of memory and cycling within bilateral iterative circuits composed of synchronously switched combinational cells are considered. A theorem is proved which shows that for every input set to such a network which admits two or more stable internal states there exists at least one internal state which will cause the circuit to cycle rather than to enter one of the stable internal states. An example is given to show that although a circuit of p cells can be constructed so that the troublesome internal states are never entered, there is no guarantee that a circuit constructed of q such cells ($q>p$) will never enter such internal states. Finally, a theorem disclosing some general properties of steady state memory within bilaternal iterative circuits is proved. (Author)

PB 157 804-2 $6.60

Digital Systems Lab., Princeton U., N. J.
MINIMAL p-POINT FUNCTIONS ON n-CUBES, by T. A. Dolotta and E. J. McCluskey, Jr. Nov 60, 69p. 4 refs. Technical rept. no. 2.

DESCRIPTORS: *Digital computers, Computers, Computer logic, *Special functions, Programming, Algebras, Electrical networks, Circuits, Design.

A completely systematic (and thereby programmable) method has been developed for finding Boolean functions of n variables and containing exactly p of the 2^n

possible points, and requiring a minimum number of gates in two stage form. N. p, and (if desired) the specific two-stage form are specified, and the method can be used to find the minimal Boolean expression satisfying these specifications. Despite the dependence of the method on partial enumeration, it is shown that a great many cases of interest can be solved. (Author)

PB 157 804-12 $2.60

Digital Systems Lab., Princeton U., N. J.
MINIMAL SUMS FOR BOOLEAN FUNCTIONS HAVING MANY UNSPECIFIED FUNDAMENTAL PRODUCTS, by E. J. McCluskey, Jr. June 61, 30p. 10 refs. Technical rept. no. 12.

DESCRIPTORS: *Digital computers, Computers, Computer logic, Circuits, *Special functions, Algebra, Numerical methods and procedures, Matrix algebra

There is a class of problems which can be specified very simply, but in practice cannot be solved using existing techniques. This class consists of those problems for which almost all of the fundamental products are unspecified. These problems can be described by specifying the fundamental products to be included in the function - the 1-terms - and the fundamental products to be excluded from the function - the 0-terms. Techniques for forming minimal sums and products have been developed which require use of only the 1-terms and the 0-terms. This specification can be in either canonical or non-canonical form. In addition, a modification of this basic technique has been developed which permits the direct generation of only the essential prime implicants. The extension of the basic technique to multiple-output networks is also described.

PB 157 804-11 $2.60

Digital Systems Lab., Princeton U., N. J.
A MODIFIED VERSION OF ALGOL FOR LOGICAL PROGRAMMING, by A. Grasselli and E. J. McCluskey, Jr. May 61, 21p. 1 ref. Technical rept. no. 11.

DESCRIPTORS: *Digital computers, Computers, Computer logic, *Programming, *Language.

Extensions of the ALGOL syntax to incorporate into the language efficient means for handling binary arrays are considered. (Author)

PB 157 804-9 $3.60

Digital Systems Lab., Princeton U., N. J.
THE REDUCTION OF REDUNDANCY IN SOLVING PRIME IMPLICANT TABLES, by I. B. Pyne and E. J. McCluskey, Jr. May 61, 39p. 2 refs. Technical rept. no. 9.

DESCRIPTORS: *Digital computers, Computer logic, *Special functions, Algebra, *Matrix algebra, Transformations (Mathematics), Numerical methods and procedures

This paper is primarily concerned with finding, in the most efficient possible way, the set of all solutions to a cyclic prime implicant table. Extensive use is made of the isomorphism between this and the problem of efficiently reducing a Boolean frontal function from the form of a product of sums of single literals to a sum of products. The transformation method commonly in use today have the disadvantage that they tend to introduce duplicate and redundant products. Several methods which appreciably reduce the number of such redundancies are presented.

PB 157 804-5 $3.60

Digital Systems Lab., Princeton U., N. J.
SIGNAL FLOW GRAPH TECHNIQUES FOR SEQUENTIAL CIRCUIT STATE DIAGRAMS, by J. A. Brzozowski and E. J. McCluskey, Jr. Apr 61, 32p. 7 refs. Technical rept. no. 5.

DESCRIPTORS: *Digital computers, Computers, Circuits, Sequence switches, *Electrical networks, Signals, Feedback, Synthesis, Algebra, Matrix algebra.

This paper considers in detail the application of signal flow graph techniques to the problem of characterizing sequential circuit state diagrams by regular expressions. The methods of graph reduction which are applicable to state diagrams are presented with the necessary modifications. The differences between the regular expression algebra and conventional signal flow graph theory are pointed out. (Author)

PB 157 804-4 $4.60

Digital Systems Lab., Princeton U., N. J.
A SURVEY OF REGULAR EXPRESSIONS AND THEIR APPLICATIONS, by J. A. Brzozowski. Apr 61, 41p. 7 refs. Technical rept. no. 4.

DESCRIPTORS: *Digital computers, Computers, Computer logic, Circuits, *Electrical networks, Sequence switches, Synthesis, Theory, Memory devices, Automation, Algebra, Special functions

This paper is an exposition of the theory of regular expressions and its applications to sequential circuits. The results of several authors are presented in a unified manner, pointing out the similarities and differences in the various treatments of the subject. Whenever possible, the terimnology and notation of sequential circuit theory is used. (Author)

PB 157 804-6 $5.60

Digital Systems Lab., Princeton U., N. J.
THE THEORY OF FINITE AUTOMATA, by John W. Randolph. Thesis. May 61, 53p. 11 refs. Technical rept. no. 6.

DESCRIPTORS: Theses, *Automation, *Digital computers, Computers, Computer logic, Theory, Magnetic tape, Algebras, Scheduling, Memory devices, Mathematics.

Finite automata are defined both informally and formally and some important results are discussed. In particular, it is shown that there exists a decision procedure for certain parts of finite automata theory, that finite automata can be used to characterize input tapes, and that input tapes can be used to characterize finite automata. The conclusion gives a brief discussion of each of the papers listed in the bibliography, with the author's opinion of their value as introductions to the subject, and a partial list of unsolved problems. (Author)

PB 157 786 $1.10

Monroe Calculating Machine Co., Orange, N. J. PASSIVE DETECTION DATA PROCESSING EQUIPMENT. Letter rept. no. 1, 1-30 Nov 53, on Contract AF 30(602)788. [1953] declassified 18 June 58, 8p.

DESCRIPTORS: *Data processing systems, Design, *Digital computers, Computers, *Computer logic, Circuits.

Work on the project during the first month encompassed laying out of the basic logical system design, theoretical determination of the logical circuitry to be employed, and bench test of some of these circuits. The major part of this report is devoted to a brief exposition of the approach to be taken in designing and building the machine. (Author)

PB 157 787 $1.60

Monroe Calculating Machine Co., Orange, N. J. PASSIVE DETECTION DATA PROCESSING EQUIPMENT. Letter rept. no. 2, 1-31 Dec 53, on Contract AF 39(602)788. [1954] declassified 18 June 58, 12p.

DESCRIPTORS: *Data processing systems, Design, *Digital computers, Computers, *Computer logic, Operation.

A description of the Input Track Section of the machine is given as the first in a series of brief explanations of typical machine operations. (Author) (See also PB 157 786)

PB 157 788 $1.10

Monroe Calculating Machine Co., Orange, N. J. PASSIVE DETECTION DATA PROCESSING EQUIPMENT, by E. J. Quinby and John F. Scully. Letter rept. no. 11, 1-30 Sep 54, on Contract AF 30(602)788. 20 Oct 54, declassified 18 June 58, 8p. 1 ref.

DESCRIPTORS: *Data processing systems, *Data storage systems, Memory devices, Design, *Digital computers, Computes, Computer logic, Circuits, Power supplies.

Included in this report is a description of the principles of the magnetic storage system. The bench-testing and experiments being conducted are to check-out record, playback, generation of clock pulses, and magnetic selection before incorporating these curcuits in the machine proper. To date, the circuits have performed satisfactorily, and bench tests are nearing completion. (Author) (See also PB 157 787)

PB 161 614 $3.00

National Bureau of Standards, Washington, D. C. A TRANSISTOR-MAGNETIC CORE DIGITAL CIRCUIT, by E. W. Hogue. June 61, 161p 10 refs. Technical note 113.

DESCRIPTORS: *Digital computers, Computers, *Circuits, *Magnetic cores, *Transistors, *Magnetic amplifiers, Amplifiers, Computer logic, Transistor amplifiers, Functions, Design, Operation, Tests.

A digital amplifier of simple noncritical design incorporating an emitter-follower and a small magnetic amplifier is described. Timing and some of the operating power are provided by a 300-kc 2-phase 7-volt sine-wave source. In structure and mode of operation, the amplifier is particularly suited for use with two-level diode gating to provide the AND and OR logical operations. A NOT-amplifier provides negation with amplification. The volt-second transfer characteristic of the stage critically determines the stability of propagation of binary signals. Factors governing the required shape of this transfer characteristic are discussed. (Author)

MECHANICS

PB 181 153 $0.50

Bureau of Naval Weapons, Washington, D. C. TORQUE WRENCH TESTER, CHATILLON 1388-S. BuWeps-BuShips Calibration Program. 29 Sep 61, 7p. [Secondary] Standards Lab. Instrument Calibration Procedure MU-04.

DESCRIPTORS: *Torque, Wrenches, Test equipment, Calibration, Instrumentation, Instruction manuals.

This procedure describes the calibration of the Chatillon 1388-S torque wrench tester, designed to measure torque which does not exceed 600 pound-inches, and in the clockwise direction only.

PB 159 846 $6.60

New York U. Coll. of Engineering, N. Y. EXPLORATORY STUDIES IN THREE DIMENSIONAL PHOTO-THERMOELASTICITY, by Herbert Tramposch and George Gerard. Rept. on Contract AF 49(638)387. Sep 59, 63p. 7 refs. Technical rept. SM 59-5; AFOSR Technical note 59-1069; AD-229 377.

DESCRIPTORS: *Photoelasticity, *Thermal stresses, Sheets, Analysis, Structures, Polariscopes, Theory.

The exploratory application of the photo-thermoelastic method is made to 3-dimensional thermal stress problems. Several of the existing 3-dimensional photoelastic techniques seemed applicable, but were found undesirable. Rather, a completely new technique was developed which utilizes an embedded polariscope consisting of 2 sheets of polarizing material cemented within the models. The technique has proved to be simple to apply particularly to axisymmetric bodies and the resulting fringe patterns are readily interpreted. The systematic evaluation of the new technique starts with strength tests of cemented joints. Then a simple bending model and a sphere are tested under mechanical loading and the resulting fringe patterns are compared with results obtained by other methods. The new technique is applied to thermal stress problems with simple 3-dimensional geometries for which theoretical solutions are available. The investigations indicate the general applicability of the new sandwich technique to 3-dimensional stress problems generated by mechanical or thermal loads. The technique is particularly applicable to thermal stress problems where other experimental stress analysis methods are not highly developed. (Author)

PB 158 435 $1.60

Polytechnic Inst. of Brooklyn, N. Y.
EDGE SOLUTIONS IN CYLINDRICAL AND CONICAL SHELLS, by Frederick V. Pohle. Final technical rept. on Contract DA 30-069-ORD-2490. Sep 60, 18p. 11 refs. PIBAL rept. 579; OOR rept. no. 2232:2-E; AD-247 222.

DESCRIPTORS: *Structural shells, Cylindrical bodies, Conical bodies, *Stresses, Analysis, Physical properties, Mathematical analysis.

A general summary of the edge effect in circular and non-circular cylindrical shells, as well as conical shells, is presented. The physical, as well as the mathematical, meaning of the solutions is discussed and various procedures which were used during the course of the work are outlined and compared with recent work as reported in the current literature. (Author)

Aerodynamics and Pneumatics

APEX-664 $3.50

General Electric Co., Cincinnati, Ohio.
GENERAL FLOW PASSAGE: A COMPUTER PROGRAM TO CALCULATE AEROTHERMAL PERFORMANCE OF AN ARBITRARY FLOW PASSAGE OF FIXED GEOMETRY, by S. C. Skirvin. Rept. on Contracts AF 33(600)38062 and AT(11-1)-171. Oct 61, 252p. 7 refs.

APEX-663 $3.00

General Electric Co., Cincinnati, Ohio
ISOTHERMALIZE: A COMPUTER PROGRAM TO SIZE COOLANT PASSAGES, by S. C. Skirvin. Rept. on Contracts AF 33(600)38062 and AT(11-1)-171. Feb 62, 200p. 3 refs.

Order from GPO $1.75 as Nas 1.2:100

National Aeronautics and Space Administration, Washington, D. C.
COLLECTION OF ZERO-LIFT DRAG DATA ON BODIES OF REVOLUTION FROM FREE-FLIGHT INVESTIGATIONS, by William E. Stoney, Jr. 1961, 188p. 32 refs. NASA Technical rept. R-100, supersedes NACA Technical note 4201, AD-152 349 and PB 126 245.

DESCRIPTORS: *Bodies of revolution, Aerodynamic configurations, Wind tunnel model, Fin stabilized ammunition, Guided missiles, Rockets, Fins, Aerodynamics, Drag, Supersonic, Transonics, Flight testing, Model tests, Tests, Data, *Aerodynamic data, Tables.

This report presents a compilation of most of the zero-lift drag results obtained from free-flight measurements made by the Langley Pilotless Aircraft Research Division on fin-stabilized bodies of revolution. The data are arranged on standard forms, which also contain the significant geometrical factors. Supplementary data have been provided to facilitate the determination of the body pressure drags from the measured total drags. Summary plots and discussions have been included to provide a unified and broad picture of the body geometry on zero-lift drags. (Author)

PB 181 169 $0.50

Naval Ordnance Lab., White Oak, Md.
RE-ENTRY HEATING SIMULATION, by W. R. Thickstun. 15 Dec 60, 14p. 3 refs. Mathematics Dept. rept. M-17; NAVORD rept. 6791.

DESCRIPTORS: *Re-entry aerodynamics, *Re-entry vehicles, *Aerodynamic heating, Simulation, Mathematical analysis, Heat transfer, Heating, Shielding, Materials.

This report describes a method of calculating aerodynamic heating for the purpose of evaluating materials for use as possible re-entry heat shields. The procedure may be described as a simplified re-entry flight simulation. This report gives in detail the assumptions made, equations used, and the form of presentation of the results. It does not give the results of such calculations. (Author)

AD-260 718 repriced $1.25

Polytechnic Inst. of Brooklyn, N. Y.
THEORETICAL ANALYSIS OF THE DOWNSTREAM INFLUENCE OF STAGNATION POINT MASS TRANSFER, by Robert Cresci. Rept. for Feb 60-May 61, on Experimental techniques for Materials Research, and Research on Aerodynamic Flow Fields, Contracts AF 33(616)5944 and AF 33(616) 7661. Nov 61, 45p. 23 refs. WADD Technical rept. 60-434.

DESCRIPTORS: Diffusion, Boundary layer, Heat transfer, *Gas flow, Enthalpy, Sweat cooling, Coolants, Injection, Blunt bodies, *Hypersonic flow,

*Aerodynamic heating, Differential equations, Mathematical analysis.

The integral method has been applied to determine the dowstream influence of homogeneous mass transfer in the stagnation region of a blunt, axisymmetric body under hypersonic flight conditions. Exponential profiles are employed in an attempt to eliminate singularities which have appeared in previous analyses utilizing polynomial profiles. These singularities arise in the presence of a favorable pressure gradient when the density at the surface is comparable to that in the external stream. The results indicate that the singularities occurring in the application of the integral method using polynomial profiles do not arise in the present analysis utilizing exponentials. The heat transfer rates obtained are compared to experimental data and are found to predict the downstream effect of the mass injection reasonably well if the results are normalized with respect to the zero mass transfer prediction. The effect, on the heat transfer rates, of varying the coolant temperature and the injection area are also investigated. It is found that decreasing the coolant temperature or increasing the injection area result in a decrease in the peak heat rate and over-all heat transferred to the body. (Author)

Hydrodynamics, Hydraulics, and Hydrostatics

PB 159 696 $6.60

Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
ANALYSIS OF LATERAL FORCE AND MOMENT CAUSED BY YAW DURING SHIP TRAINING, by Milton Martin. Rept. on Contract Nonr-263(13). Mar 61, 62p. 28 refs. Rept. R-792; AD-253 679.

DESCRIPTORS: *Marine engineering, *Ship hulls, Ship models, Stability, Guidance, Motion, Moments, Experimental data, Analysis, Lift, *Dynamics, *Hydrodynamics, Fluid mechanics, Stability (Lateral), Boundary layer, Yaw, *Fluid flow.

Data were analyzed to develop a rational method for predicting the lateral force and moment due to angle of drift alone on a bare hull. The data were obtained in measurement of the lateral force and moment both in straight course and in steady turns on 8 related model hulls in which the beam, draft, and skeg length were the only variable parameters. The problem of developing a method of predicting lateral ship motions are discussed briefly.

PB 157 525 $1.60

Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
COMPARISON OF EXPERIMENTALLY MEASURED AND THEORETICALLY ESTIMATED BENDING MOMENTS OF THREE MODELS IN REGULAR HEAD SEAS, by Winnifred R. Jacobs and Anne Maday. July 59, 13p. 6 refs. Rept. no. 774.

DESCRIPTORS: *Ship models, *Tankers, Model tests, *Ship hulls, Deflection, Moments, Hydrodynamics, Water waves, Experimental data, Theory, Analysis.

A comparison is presented of the previously published experimental results, for the three models operating in regular model-length L/51 head seas, with estimated bending moments at the midsection calculated by a "strip" method of computing the forces acting on a ship's hull. This linearized method was developed by Korvin-Kroukovsky and was used in estimating dynamic bending moments on the T-2 Tanker. (See also PB 157 524)

PB 157 524 $8.10

[Davidson Lab.] Stevens Inst. of Tech., Hoboken, N. J.
EFFECT OF SPEED AND FULLNESS ON HULL BENDING MOMENTS IN WAVES, by John F. Dalzell. Feb 59, 84p. 18 refs. Rept. no. 707.

DESCRIPTORS: *Ship models, *Tankers, Model tests, *Ship hulls, Deflection, Moments, Load distribution, Water waves, Hydrodynamics, Velocity, Vibration, Reflections, Statics.

This report presents the results of a series of tests on three tanker models in regular model-length head and following waves and in irregular head seas for the measurement of external loads in terms of bending moments at the midship section. For low speeds in both regular and irregular head and following waves, the variation of bending moments with fullness followed trends indicated by conventional static calculations, i.e., the hogging and sagging moments increased with increasing block coefficient. At high speeds in both regular and irregular head seas, hogging moments varied with fullness in the same manner, but sagging moments reversed the trend, i.e., the sagging moments decreased with increasing fullness. A gradual upward trend of bending moments at the midship section was observed in model-length regular head and following seas as the model speed was increased from zero. At speeds where synchronism between the period of encounter with waves and the natural pitching period occurred, this gradual rise leveled off, while at higher speeds the bending moments, in general, decreased. The moments measured in model-length waves were found to be smaller than the values obtained by conventional static calculations. An upward trend of bending moment with increasing speed was observed in irregular head seas. (Author)

PB 157 526 $4.60

Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
LONGITUDINAL BENDING AND TORSIONAL MOMENTS ACTING ON A SHIP MODEL AT OBLIQUE HEADINGS TO WAVES, by Edward Numata. Apr 60, 41p. 14 refs. Rept. no. 777.

DESCRIPTORS: *Ship models, *Tankers, *Hydrodynamics, Stresses, Moments, Deflection, Model tests, Stability (Lateral), Stability (Longitudinal), Water waves.

Tests were conducted with a model of a T2-SE-A1 tanker running at oblique headings to waves to measure torsional moments and vertical and lateral components of longitudinal bending moments at the midship section. Trends of moments with speed and wave direction in regular long-crested waves of various lengths are presented. Statistical characteristics of moment responses at one speed and heading in irregular long-crested waves are given. The relative importance of lateral bending is explored by using model results to predict longitudinal bending stresses in a T-2 tanker deck caused by the combined action of vertical and lateral moments, and it is shown that lateral bending can contribute significantly to these stresses. (Author)

Order from GPO $0.75 as
NAS 1.12:93

National Aeronautics and Space Administration, Washington, D. C.
THEORETICAL AND EXPERIMENTAL INVESTIGATION OF SUPERCAVITATING HYDROFOILS OPERATING NEAR THE FREE WATER SURFACE, by Virgil E. Johnson, Jr. 1961, 78p. 21 refs. NASA Technical rept. R-93; supersedes NACA RM L57G11a and NACA RM L57I16.

DESCRIPTORS: *Hydrofoils, Theory, Experimental data, Design, Operation, Cavitation, Drag, Thickness, Aspect ratio, Fluid mechanics, *Hydrodynamics.

The linearized theory for infinite depth is applied to the design of two new low-drag supercavitating hydrofoils. A theory for determining the characteristics of supercavitating hydrofoils of arbitrary camber which includes the effects of depth of submersion, aspect ratio, and thickness is presented. The results of an experimental investigation of an aspect-ratio-1 flat plate and a cambered section are also presented. The theory agrees with the experimental data of the present report and with experimental data taken from other sources. (Author)

PB 159 700 $5.60

Wigley, C. (Gt. Brit.)
CALCULATION OF WAVE RESISTANCE AT LOW AND MODERATE SPEEDS, by C. Wigley. Rept. no. 3 on Contract N62558-1772. Mar 61, 53p. 8 refs. AD-253 946.

DESCRIPTORS: *Water waves, *Hydrodynamics, Propagation, Wave analysis, Resistance, Bodies of revolution, Integrals, Model tests.

Contents:
Calculations for unsymmetrical forms
Calculations for models of fuller cross-sections
Summary of results of calculation of corrected wave-resistance
Havelock's suggestion regarding approximation to the viscous effect on wave-resistance
Summary of results from three reports, and suggestions for further development.

NYO-10007 $0.50

Aeroprojects Inc., West Chester, Pa.
ULTRASONIC HOT PRESSING OF METALS AND CERAMICS, by William B. Tarpley and Herbert Kartluke. Rept. on Contract AT(30-1)-1836. Dec 61, 27p. 24 refs.

NAA-SR-6551 $0.75

Atomics International, Canoga Park, Calif.
DIFFUSION OF Au AND Cu IN A TEMPERATURE GRADIENT, by C. J. Meechan and Guy W. Lehman. Rept. on Contract AT(11-1)-GEN-8. Mar 62, 29p. 20 refs.

NAA-SR-6642 $1.00

Atomics International, Canoga Park, Calif.
FISSION DAMAGE IN METALS, by J. A. Brinkman. Rept. on Contract AT(11-1)-GEN-8. 1 Mar 62, 50p. 16 refs.

NAA-SR-6674 $0.50

Atomics International, Canoga Park, Calif.
OXIDATION OF ZIRCONIUM AND ZIRCONIUM ALLOYS IN LIQUID SODIUM, by T. L. Mackay. Rept. on Contract AT(11-1)-GEN-8. 15 Feb 62, 21p. 23 refs.

PB 159 834 $9.10

Battelle Memorial Inst., Columbus, Ohio.
THE EFFECTS OF IMPURITIES ON THE PROPERTIES OF TUNGSTEN, by B. C. Allen, D. J. Maykuth, and R. I. Jaffee. Final rept. 1 Dec 58-1 Dec 59, on Contract AF 29(601)1589. 15 Dec 59, 103p. 24 refs. AFSWC-TR-60-6; AD-238 042.

DESCRIPTORS: *Tungsten, Sheets, Impurities, Additives, Grains (Metallurgy), Crystallization, Temperature, *Powder alloys, *Tungsten alloys, Mechanical properties, Brittle materials, Single crystals, Transition temperature.

The program involved the investigation of the factors believed responsible for brittle behavior in tungsten with a view toward overcoming this difficulty in sheet material. Studies on electron-beam-refined tungsten single crystals showed that small amounts of carbon, oxygen, and nitrogen did not change the mode of deformation at 400 C. Oxygen and nitrogen appeared to have little effect and carbon tended to raise the recrystallization temperature, which was found to be 1200 to 1500 C. Carbon and probably oxygen caused refinements in the recrystallized grain size. However, when the temperature of recrystallization was increased above 2000 C, the recrystallized grain sizes of all specimens tended to approach the same value. Addition of

certain refractory oxides, nitrides, and carbides raised the recrystallization temperature of powder-metallurgy tungsten from 1600-1700 C to 1800 C. Some additions refined the grain size and caused columnar grain formation. The bend ductile-brittle transition temperature was lowered from 230 to 150 C for wrought and from 420 to 330 C for the recrystallized condition by the presence of 2 volume per cent of zirconia or thoria plus sodium oxide. The ductile-brittle transition temperature for wrought and recrystallized single crystals was 320 C. (Author)

BMI-1567 $0.50

Battelle Memorial Inst., Columbus, Ohio.
A THEORETICAL STUDY OF THE ROTARY SIZING OF URANIUM TUBE, by Edward G. Bodine, Edward G. Smith, and Stan J. Paprocki. Rept. on Contract W-7405-eng-92. 15 Feb 62, 24p. 8 refs.

SEP-259 $0.50

Bayside Labs., General Telephone and Electronics Labs., Inc., N. Y.
FUNDAMENTALS OF SINTERING - VI, by J. Brett and L. Seigle. Annual progress rept. 1 July 60-30 June 61, on Contract AT(30-1)-2102. 15 Dec 61, 26p. 13 refs.

Order from GPO $0.35 as
I 28.27:8039

Bureau of Mines, Washington, D. C.
SPECTROCHEMICAL ANALYSIS OF HIGH-PURITY METALS: A REVIEW AND BIBLIOGRAPHY OF RECENT LITERATURE, by Maurice J. Peterson. [1961] 47p. 174 refs. Information Circular 8039.

DESCRIPTORS: *Metals, Impurities, Spectrographic analysis, Chemical analysis, *Bibliography.

The applications of optical spectrochemical methods of analysis for determining trace impurities in metals are described, and the need for developing analytical procedures capable of accurately determining fractional parts per million of impurity elements in metals is stressed. Factors which determine sensitivity of detection and means to extend sensitivity levels in spectrochemical methods are discussed. Examples from the current literature illustrate the diversity of spectrochemical techniques that have been applied to the analyses of varied sample types. Many of the methods use preconcentration procedures to increase sensitivity limits. A bibliography containing abstracts of recent methods is included.

APEX-676 $1.00

General Electric Co., Cincinnati, Ohio
RADIATION EFFECTS ON THE STRESS RUPTURE PROPERTIES OF INCONEL X AND A-286, by C. G. Collins, W. H. Couts and others. Rept. on Contracts AF 33(600)-38062 and AT(11-1)-171. Dec 61, 42p. 14 refs.

HW-71771 $0.50

Hanford Atomic Products Operation, Richland, Wash.
CORROSION TESTS ON KER-1 ZIRCALOY-2 PROCESS TUBE, by H. P. Maffei. Rept. on Contract AT(45-1)-1350. Sep 61, 18p. 2 refs.

HW-70638 $1.00

Hanford Atomic Products Operation, Richland, Wash.
ULTRASONIC TESTING OF HEAVY-WALLED ZIRCALOY TUBING, by R. C. Aungst. Rept. on Contract AT (45-1)-1350. 4 Aug 61, 40p.

KAPL-2171 $0.75

Knolls Atomic Power Lab., Schenectady, N. Y.
CONTROL OF FISSURING IN INCONEL BY REGULATING PROCESS VARIABLES, by J. D. Carey and G. F. McKittrick. Rept. on Contract W-31-109-eng-52. 18 Sep 61, 25p. 3 refs.

AD-271 571 repriced $2.50

Michigan U., Ann Arbor.
EFFECT OF CREEP-EXPOSURE ON MECHANICAL PROPERTIES OF RENE 41. PART II: STRUCTURAL STUDIES, SURFACE EFFECTS, AND RE-HEAT TREATMENT, by Jeremy V. Gluck and James W. Freeman. Rept. for 1 Apr 60-31 May 61, on Materials Application, Contract AF 33(616)6462. Nov 61, 120p. 22 refs. ASD Technical rept. 61-73, Part II.

DESCRIPTORS: *Nickel alloys, Aluminum alloys, Titanium alloys, *Heat resistant alloys, Alloys, Mechanical properties, Creep, Rupture, Metallurgy, Heat treatment, Thermal stresses, Stresses, Fracture (Mechanics), Tensile properties, Impact shock, Crystal structure, Microstructure, Surface properties, Tests.

The effect of creep-exposure on room temperature mechanical properties of Rene 41 was studied for temperatures of 1200-1800°F and times up to 200 hours. Unstressed exposures were for as long as 2012 hours at 1700°F. Thermally-induced structural changes reduced strength and ductility after exposures at 1400-1800°F. Reduced yield strength was due to decreased volume fraction of gamma prime and secondarily to an increase in the particle size. Ductility was reduced by formation of massive grain boundary carbides. Up to 1500°F, creep caused strain hardening and Bauschinger effects. Except for surface effects, damage was restorable by re-heat treatment. Yield strength was restored by re-solution and re-aging to produce fine gamma prime. Complete re-solution of carbides was required to restore ultimate strength and ductility. Microcracking was not observed. Creep induced intergranular surface cracking at 1200-1300°F which reduced ductility. Surface effects for exposures above 1400°F were thermally induced. General principles were formulated for damage to properties of nickel-base alloys. (Author)

NMI-2099 $1.60

Nuclear Metals, Inc., Concord, Mass.
FUNDAMENTAL AND APPLIED RESEARCH AND DEVELOPMENT IN METALLURGY. Progress rept. for Sep 61, on Contract AT(30-1)-1565. 14 Dec 61, 14p. 8 refs.

SCR-307 $0.75

Sandia Corp., Albuquerque, N. Mex.
COATINGS FOR URANIUM, by Dwight E. Couch and Albert M. Brown. Final rept. 1 March 59-1 July 60. [1962] 36p. 17 refs.

DP-622 $0.50

Savannah River Lab., Aiken, S. C.
CREEP OF ALUMINUM-LITHIUM ALLOY, by R. P. Marshall. Rept. on Contract AT(07-2)-1. Oct 61, 20p. 5 refs.

DP-607 $0.50

Savannah River Lab., Aiken, S. C.
MEASUREMENT OF PREFERRED ORIENTATION OF THIN-WALLED ZIRCALOY-2 TUBES, by E. F. Sturcken and W. G. Duke. Rept. on Contract AT(07-2)-1. May 61, pub. Nov. 61, 23p. 11 refs.

PB 156 854 $2.60

Wah Chang Corp., Albany, Oreg.
REDUCTION AND CONSOLIDATION OF SUPERIOR QUALITY MOLYBDENUM ALLOYS, by Stephen Yih, Edmund Baroch, and James Wong. Bi-monthly rept. 3 Mar-30 Apr 60, on Contract Noas 60-6046-c. 3 June 60, 29p. 2 refs. Interim rept. no. WCA 1001-1.

DESCRIPTORS: *Molybdenum alloys, Alloys, Powder alloys, Calcium, Oxides, *Intemetallic compounds, Reduction, Processing, Melting, Electron beams, Sintered alloys, Sheets, Production, Impurities, Hydrogen, Bombs, Loading Detonation.

Investigation of the bomb reduction of molybdenum trioxide with calcium metal producing approximately 50 pounds of molybdenum metal during each run. Preliminary results have shown that the hardness of bomb reduced material is between 140-150 BHN with total interstitial levels of less than 500 PPM, nitrogen and oxygen predominating.

NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

NYO-2607 $1.25

Air Reduction Co., Inc., Murray Hill, N. J.
FISSION PRODUCT APPLICATIONS USING GASEOUS BETA SOURCES. TASK I, by Hoke S. Miller, John H. Zufall, and William G. Marancik. Final rept. on Contract AT(30-1)-2343. Sep 60, 55p. 14 refs.

IS-331 $1.50

Ames Lab., Iowa State U. [of Science and Tech.]
HEAT CAPACITY AND MAGNETIC SUSCEPTIBILITY OF THULIUM ETHYLSULFATE, by Bernard Clemence Gerstein and F. H. Spedding. Rept. on Contract W-7405-eng-82. Aug 60, 57p. 208 refs.

ANL-6498 $1.75

Argonne National Lab., Ill.
THE MODERATION OF NEUTRONS IN NON-MULTIPLYING INFINITE HOMOGENEOUS MEDIA, by Kwang-Shik Min. Rept. on Contract W-31-109-eng-38. Jan 62, 66p. 6 refs.

ANL-6250 $2.75

Argonne National Lab., Ill.
STUDIES OF METAL-WATER REACTIONS AT HIGH TEMPERATURES. II. TREAT EXPERIMENTS: STATUS REPORT ON RESULTS WITH ALUMINUM, STAINLESS STEEL-304 URANIUM, AND ZIRCALOY-2, by Robert C. Liimatainen, Richard O. Ivins and others. Rept. on Contract W-31-109-eng-38. Jan 62, 172p. 56 refs.

TID-14879 $5.60

Armour Research Foundation, Chicago, Ill.
DISSOLUTION OF FUEL ADDITIONS IN MOLTEN BISMUTH. Final rept. 28 July-31 Dec 58, on Contract AT(30-1)-1940-7. 13 Feb 59, 51p. 3 refs. ARF proj. B156.

TID-14878 $7.60

Armour Research Foundation, Chicago, Ill.
SOLUBILITY OF URANIUM IN LIQUID BISMUTH. Final rept. 4 Feb-31 Dec 58, on Contract AT(30-1)-1940-7. 26 Jan 59, 76p. 6 refs. ARF proj. B-142.

WAPD-T-1380 $1.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
CALCULATED AND MEASURED NEUTRON ENERGY SPECTRAL DISTRIBUTIONS USING THE THRESHOLD DETECTOR TECHNIQUE, by W. D. Lanning and K. W. Brown. Rept. on Contract AT(11-1)-GEN-14. Sep 61, 18p. 9 refs.

BNL-689(T-235) $0.50

Brookhaven National Lab., Upton, N. Y.
ADSORPTION OF XENON ON ACTIVATED CHARCOAL, by W. F. Kenney and A. M. Eshaya. Sep 60, 20p. 38 refs.

BNL-676(T-225) $1.50

Brookhaven National Lab., Upton, N. Y.
SOME APPLICATIONS OF CHANDRASEKHAR'S METHOD TO REACTOR THEORY, by Theodore Auerbach. Jan 61, 58p. 36 refs.

PB 159 778 $1.60

California U., La Jolla.
IMAGE OF THE FERMI SURFACE IN SPIN WAVE SPECTRA OF RARE EARTH METALS, by Edwin J. Woll, Jr. and Stephen J. Nettel. Technical rept. on Contract Nonr-2216(11). [1960] 15p. 12 refs. AD-254 580.

DESCRIPTORS: *Rare earth elements, Surfaces, *Nuclear spins, Crystal structure, Crystals, Magnetic properties, Antiferromagnetism, Brillouin zones, Ferromagnetic materials, Numerical analysis, Mathematical analysis, Electrons, Atomic energy levels.

Calculations of spin wave spectra in rare earth metals were conducted to find whether images of the electronic Fermi surface might be observable. In the space of spin wave vectors q there should occur surfaces on which the frequencies have an infinite gradient with respect to q, the location of such abrupt changes, kinks in the dispersion curves, being determined by the shape of the Fermi surface. The spin wave spectrum is found by assuming that the coupling between ionic spins takes place primarily through exchange scattering of conduction electrons, paralleling the calculation of the coupling of nuclear spins by Ruderman and Kittel (Phys. Rev. 96:99, 1954). Spin wave dispersion curves in two directions of high symmetry are computed numerically. The sought-for kinks in the dispersion curves amounted to about 2% of the maximum excitation frequency. The development is for ferromagnets, but extension to spiral antiferromagnets is taken up briefly. (Author)

PB 159 682 $1.60

Carnegie Inst. of Tech., Pittsburgh, Pa.
NUCLEAR COLLECTIVE MOTION AND THE SHELL MODEL, by Michel Baranger, Technical rept. no. 6, on Contract Nonr-760(15). 3 Feb 61, 17p. AD-252 180.

DESCRIPTORS: *Nuclear shell models, Nucleons, Motion, Theory.

TID-14256 $4.60

Case Inst. of Tech., Cleveland, Ohio.
NUCLEAR PHYSICS LABORATORY. Progress rept. 1 Nov 60-31 Oct 61, on Contract AT(11-1)-720. 24 Nov 61, 48p. 19 refs.

GA-2544 $3.00

General Atomic Div., General Dynamics Corp., San Diego, Calif.
INTEGRAL NEUTRON THERMALIZATION, by J. R. Beyster, W. M. Lopez and others. Annual summary rept. 1 Oct 60-30 Sep 61, on Contract AT(04-3)-167. 30 Sep 61, 225p. 59 refs.

APEX-702 $3.00

General Electric Co., Cincinnati, Ohio
PROGRAM ODD - A ONE-DIMENSIONAL MULTI-GROUP CODE FOR THE IBM-7090 (ANP PROGRAM NO. 657), by P. G. Fischer, F. D. Wenstrup, and T. A. Hoffman. Rept. on Contracts AF 33(600)-38062 and AT(11-1)-171. 30 June 61, 195p.

APEX-704 $2.75

General Electric Co., Cincinnati, Ohio
REACTOR NEUTRON CROSS SECTIONS IN FINE ENERGY DETAIL, by J. R. Cooper, R. E. Sullivan, and W. B. Henderson. Rept. on Contract AF 33(600)-38062 and AT(11-1-171. Nov 61, 150p. 44 refs.

GEMP-102 $2.50

General Electric Co., Cincinnati, Ohio
SPECIALIZED REACTOR-SHIELD MONTE CARLO PROGRAM 18-0, by J. E. MacDonald, J. T. Martin, and J. P. Yalch. Rept. on Contract AT(40-1)-2847. Oct 61, 119p. 6 refs.

GA-910 $1.25

General Atomic Div., General Dynamics Corp., San Diego, Calif.
STUDIES OF THE SZILARD-CHALMERS PROCESSES, by Rodman A. Sharp and Roman A. Schmitt. Rept. on Contract AT(04-3)-167. 15 Aug 59, 42p. 13 refs.

TID-14137 $2.60

Illinois U., Urbana
K- ABSORPTION AND THE Y_0, by R. L. Schult and R. H. Capps. 31 Nov 61, 21p. 12 refs.

KAPL-2000-16 $2.75

Knolls Atomic Power Lab., Schenectady, N. Y.
REACTOR TECHNOLOGY REPORT NO. 19. PHYSICS. Rept. on Contract W-31-109-eng-52. Dec 61, 187p.

UCRL-9908 $0.75

Lawrence Radiation Lab., U. of California, Berkeley.
ACTIVATION ANALYSIS FOR OXYGEN AND OTHER ELEMENTS BY MEANS OF He^3 -INDUCED NUCLEAR REACTIONS, by Samuel S. Markowitz and John D. Mahony. Rept. on Contract W-7405-eng-48. 9 Nov 61, 34p. 10 refs.

UCRL-9924 $1.60

Lawrence Radiation Lab., U. of California, Berkeley.
THE RADIOLYSIS OF LIQUID ISOBUTANE WITH PULSED ELECTRONS, by B. Y. Yamamoto, A. F. Sciamanna, and Amos S. Newton. Rept. on Contract W-7405-eng-48. Oct 61, 10p. 2 refs.

LA-2595 $3.00

Los Alamos Scientific Lab., N. Mex.
THE DISCRETE S_n APPROXIMATION TO TRANSPORT THEORY, by Clarence E. Lee. Rept. on Contract W-7405-eng-36. 9 Mar 62, 205p. 35 refs.

ORNL-3232 $0.50

Oak Ridge National Lab., Tenn.
DISSOCIATION AND IONIZATION OF H_2^+ BY ELECTRONS AND PROTONS, by R. G. Alsmiller, Jr. Rept. on Contract W-7405-eng-26. Mar 62, 19p. 7 refs.

CU(PNPL)-211 $5.60

Pegram Nuclear Physics Labs., Columbia U., New York.
PROGRESS REPORT FOR JANUARY-MARCH 1961. Rept. on Contract AT(30-1)-GEN-72. [1961] 54p.

CU(PNPL)-212 $4.60

Pegram Nuclear Physics Labs., Columbia U., New York.
PROGRESS REPORT FOR APRIL-JUNE 1961. Rept. on Contract AT(30-1)-GEN-72. 1961, 48p.

AD-270 876 repriced $0.75

Physics Lab., Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
RADIATION CHEMISTRY OF PENTANE ISOMERS, by Roger E. Rondeau and Dennis R. Johnson. Rept. June 59-Nov 60, on Chemistry and Physics of Materials. Apr 61, 23p. 21 refs. WADD Technical rept. 61-38.

DESCRIPTORS: *Pentanes, *Isomers, *Radiochemistry, Chemistry, Cobalt, Gamma rays, Hydrogen, Methanes, Acetylenes, Ethanes, Propenes, Propanes, Butenes, Butanes, Free radicals, Chemical reactions, Hydrocarbons, Radiation effects, Physical chemistry.

Three isomeric pentane gases were exposed to Cobalt 60 gamma rays and the hundred electron volt yields of the lower molecular weight products were determined.

The isomers studied were normal, iso-, and neopentane. The products formed from each isomer were: hydrogen, methane, acetylene, ethane, propene, propane, butenes, and butanes. Some of the radiolysis products are explained on the basis of free radical reactions and mechanisms. (Author)

RRL-71 $1.60

Radiation Research Labs., Mellon Inst., Pittsburgh, Pa.
QUARTERLY REPORT, 1 OCTOBER-31 DECEMBER 61, on Contract AT(30-1)-2310. Jan 62, 19p. 3 refs.

NYO-9830 $3.60

Radiation Applications, Inc., Long Island City, N.Y.
A STUDY OF THE MECHANISM OF RADIATION-INDUCED GELATION IN MONOMER-POLYMER MIXTURES, by George Odian, Bruce S. Bernstein, and James J. Kelly. Quarterly summary rept. 1 Aug-31 Oct 61, on Contract AT(30-1)-2816. 8 Nov 61, 31p. 3 refs.

NYO-10029 $1.60

Rochester U., N. Y.
THE $He^3/(He^3+He^4)$ RATIO IN PRIMARY COSMIC RADIATION, by M. V. K. Appa Rao. Rept. on Contract AT(30-1)-875. 17 Nov 61, 19p. 10 refs.

TID-13427 $2.60

Rutgers State U., Newark, N. J.
ISOTOPIC FRACTIONATION OF NITROGEN IN THE NITROGEN OXIDE-NITRATE EXCHANGE SYSTEM, by Marvin J. Stern, Lois Nash Kauder, and W. Spindel. Rept. on Contract AT(30-1)-2250. 25 Aug 61, 26p. 28 refs.

TID-13376 $5.60

Stockholm U. (Sweden)
AN INVESTIGATION OF TRITIUM IN ATMOSPHERIC MOISTURE, RAINWATER AND THE SEA IN THE EUROPEAN AREA. by Bert Bolin. Annual progress rept. on Contract AT(30-1)-2458. 1 July 61, 60p. 2 refs.

Elementary Particles

TID-13768 $1.60

Illinois U., Urbana
SCATTERING OF LOW ENERGY K^--MESONS BY NUCLEI, by J. H. Hetherington and D. G. Ravenhall. 21 Oct 61, 11p. 12 refs.

TID-14188 $3.60

Stevens Inst. of Tech., Hoboken, N. J.
NONADIABATIC PARTICLE MOTION IN AXISSYMMETRIC FIELDS, by George Schmidt. Rept. on Contract AT(30-1)-2813. Oct 61, 35p. 17 refs.
SIT-P48(10/61)

IS-371 $2.25

Ames Lab., Iowa State U. [of Science and Tech.]
A SYSTEM FOR ADMINISTERING AIR-BORNE CONTAMINANTS BY INHALATION, by Robert Monroe Cook and R. W. Fisher. Rept. on Contract W-7405-eng-82. May 61, 113p. 32 refs.

ANL-6479 $0.50

Argonne National Lab., Ill.
AN ELECTRONIC PULSE DIVISION CIRCUIT, by Edgar F. Bennett. Rept. on Contract W-31-109-eng-38. Feb 62, 10p.

ARF-1192-3 $1.10

Armour Research Foundation, Chicago, Ill.
A STUDY OF THE FEASIBILITY OF USING SCINTILLATING FIBERS FOR LOW ENERGY BETA COUNTING, by C. Preston. Quarterly rept. no. 1, 15 June-14 Sep 61, on Contract AT(11-1)-578. 5 Jan 62, 6p.

TID-13718 $1.10

Cambridge Electron Accelerator, Harvard U., Mass.
SPACE CHARGE EFFECT DUE TO ION TRAPPING, by K. W. Robinson. 5 Sep 58, 8p. CEA-63.

TID-13433 $6.60

Gibbs and Hill, Inc., New York.
PROTON ACCELERATOR BUILDINGS AND SUPPORTING FACILITIES. Design and Construction completion rept. on Contract AT(30-1)-1916. jan 61, 64p. PPAD-411-D.

HW-71314 $0.50

Hanford Atomic Products Operation, Richland, Wash.
A 2-1/2-INCH DIAMETER TELEVISION CAMERA, by A. N. Iverson. Rept. on Contract AT(45-1)-1350. Oct 61, 11p.

PB 159 836 $2.60

Industrial Lab., Mare Island Naval Shipyard, Vallejo, Calif.
DEVELOPMENT OF A PROCEDURE FOR CALIBRATING A WELL-TYPE SCINTILLATION DETECTOR FOR THE MEASUREMENT OF ABSOLUTE RADIOACTIVITY, by Paul T. Wagner and Louis R. Pollack. [1957] 23p. 3 refs. Rept. no. 7799-58; AD-212 410.

DESCRIPTORS: *Scintillation counters, Calibration, Sodium compounds, Iodides, Crystals, *Radioactivity, Detection, Counting methods, Radioactive decay, Gamma rays, Photons, Radioactive isotopes.

A procedure is described for obtaining the relationship between counts per minute and disintegrations per minute, using a well-type scintillation crystal which is considered, from a geometrical standpoint, as completely surrounding the radioactive sample in the test tube. Attenuation losses through the crystal wall are calculated using an empirical thickness which gives the correct result with standard samples. The decay schemes of the radionuclides must be known, and losses due to coincident attenuations, in the case of more than one photon emission per disintegration, must be taken into account. Conversion factors are listed for eleven radioisotopes, in addition to a mean conversion factor for obtaining an estimate of absolute radioactivity when the concentration and identities of the radioisotopes present are not known. The method is applicable to any radionuclide with a known decay scheme which emits a predominant gamma ray of 0.24 Mev or greater energy. (Author)

UCRL-6669 $0.50

Lawrence Radiation Lab., U. of California, Livermore.
A CROSSED BEAM MACHINE FOR MEASURING ATOMIC COLLISION CROSS SECTIONS, by Gilbert O. Brink. Rept. on Contract W-7405-eng-48. 12 Dec 61, 22p. 3 refs.

UCRL-10001 $1.75

Lawrence Radiation Lab., U. of California, Berkeley,
NOISE CONSIDERATIONS IN NUCLEAR PULSE AMPLIFIERS, by Donald A. Landis. Rept. on Contract W-7405-eng-48. 20 Dec 61, 69p. 14 refs.

TID-13956 $4.60

Midwestern Universities Research Association, Madison, Wis.
THE MURA GENERAL CONFERENCE DECEMBER 2-3, 1960. MINUTES NO. 119. 41p.

MURA-630 $0.50

Midwestern Universities Research Association, Madison, Wis.
THE PARMESH DYNAMICS PROGRAM, by Jess Anderson and George Parzen. Rept. on Contract AT(11-1)-384. 6 Dec 61, 8p.

IDO-16715 $0.50

Phillips Petroleum Co., Idaho Falls.
DESIGN OF AN AUTOMATIC FOIL COUNTING DATA SYSTEM, by R. I. Little. Rept. on Contract AT(10-1)-205. 26 Jan 62, 22p. 1 ref.

NYO-9683 $2.60

Rochester U., N. Y.
BROAD RANGE SPECTROGRAPH FOR USE WITH THE ROCHESTER 27" CYCLOTRON, by W. Parker Alford, O. M. Bilaniuk, and R. A. Hawrylak. Mar 62, 25p. 13 refs.

TID-14224 $2.60

Stanford U., Calif.
SHOWER DEVELOPMENT AND HEATING THE ACCELERATING STRUCTURE OF A 50-BEV LINEAR ELECTRON ACCELERATOR, by J. J. Muray. Rept. on Contract AT(04-3)-363. Sep 61, 30p. 7 refs. M-276.

PB 159 802-1 $1.60

Weston Instruments Div., Daystrom, Inc., Newark, N. J.
ROENTGEN RATE METER. Interim development rept. 20 Apr-20 July 59, on Contract NObsr-77566. 4 Aug 59, 12p. AD-245 430.

DESCRIPTORS: *Dosimeters, Design, Tests, Meters, Radioactivity, Military requirements

The purpose is to develop a Roentgen Rate Meter which is used to display a measurement of radiation rate when properly connected to the AN/PDR series radiac equipment. The instrument proper is to contain two input modes of operation which function simultaneously when properly connected to the AN/PDR series radiac equipment system. The first mode of operation is to automatically index the shaft that protrudes from the instrument case barrel to select the proper scale range. This is accomplished by coupling to the instrument a switching device that is part of the external system. The second mode of operation is to apply a calibrated d-c current to the instrument terminals which will deflect the pointer to an angular position corresponding to the actual value of radiation rate.

PB 159 802-2 $1.60

Weston Instruments Div., Daystrom, Inc., Newark, N. J.
ROENTGEN RATE METER. Interim development rept. 20 July-20 Oct 59, on Contract NObsr-77566. 12 Nov 59, 11p. AD-245 427.

DESCRIPTORS: *Dosimeters, Design, Tests, Meters, Radioactivity, Military requirements

The design work was completed. The design consists of a modified Weston Model 1531 ruggedized indicating mechanism, a mounting base, a self-contained range-changing mechanism, and a housing similar to that employed in the Weston ruggedized and sealed line of meters. Provision is made to allow for external illumination. (See also PB 159 802-1)

PB 159 802-3 $1.10

Weston Instruments Div., Daystrom, Inc., Newark, N. J.
ROENTGEN RATE METER. Interim development rept. 20 Oct 59-20 Jan 60, on Contract NObsr-77566. 10 Feb 60, 10p. AD-245 482.

DESCRIPTORS: *Dosimeters, Design, Tests, Meters, Radioactivity, Military requirements

Model Shop fabrication of initial test samples was completed and procurement of purchased parts pursued. Mock-up housings were assembled and subjected to various MIL-M-10304A tests to determine if the housing design is capable of meeting various temperature, humidity, dielectric, and water tightness test requirements. The portion of the design submitted to test consisted of the zero corrector, range-changing drive shaft, back connection studs and window. (See also PB 159 802-2)

PB 159 802-4 $1.60

Weston Instruments, Div., Daystrom, Inc., Newark, N. J.
ROENTGEN RATE METER. Interim development rept. 20 Jan-20 Apr 60, on Contract NObsr-77566. 26 Apr 60, 12p. AD-245 429.

DESCRIPTORS: *Dosimeters, Design, Tests, Meters, Radioactivity, Military requirements.

Purchased parts were procured and Model Shop fabrication of initial samples was completed. (See also PB 159 802-3)

PB 159 802-5 $2.60

Weston Instruments Div., Daystrom, Inc., Newark, N. J.
ROENTGEN RATE METER. Interim development rept. 20 Apr-20 July 60, on Contract NObsr-77566. 5 5 Aug 60, 27p. 2 refs. AD-246 017.

DESCRIPTORS: *Dosimeters, Design, Tests, Meters, Radioactivity, Military requirements.

Evaluations of pivots and window materials to the proposed MIL-M-10304B requirements and the range changing mechanism toward reliability were performed. A performance analysis is discussed. (Author) (See also PB 159 802-4)

TID-14135 $1.10

Yale U., New Haven, Conn.
PHASE MEASUREMENT OF LINEAR ACCELERATOR BEAM BUNCHES. YALE STUDY ON HIGH INTENSITY PROTON ACCELERATORS, by R. Beringer. Internal rept. Y-5. 13 Sep 61, 6p.

Nuclear Engineering and Power

NYO-9587 $1.00

Aeroprojects Inc., West Chester, Pa.
ULTRASONIC FILLING OF TUBULAR CLADDING WITH CERAMIC FUEL POWDERS, by William B. Tarpley and Richard Pheasant. Rept. on Contract AT(30-1)-1836. Nov 61, 40p. 10 refs.

NYO-10009 $0.50

Aeroprojects, Inc., West Chester, Pa.
ULTRASONIC IMPREGNATION: PREPARATION OF LOW PERMEABILITY GRAPHITE, by William B. Tarpley and Herbert Kartluke. Rept. on Contract AT(30-1)-1836. Dec 61, 16p. 13 refs.

ANL-6451 $2.75

Argonne National Lab., Ill.
ARGONNE ADVANCED RESEARCH REACTOR, by D. H. Lennox, E. W. Barts, and others. Status rept. on Contract W-31-109-eng-38. Nov 61, 166p.

ANL-6494 $0.50

Argonne National Lab., Ill.
CRITICAL STUDIES OF A FAST REACTOR CORE CONTAINING DEPLETED URANIUM AND SODIUM AS DILUENTS (ZPR-III ASSEMBLY 36), by J. M. Gasidlo, J. K. Long, and R. I. McVean. Rept. on Contract W-31-109-eng-38. Jan 62, 23p. 10 refs.

ANL-6162 $1.50

Argonne National Lab., Ill.
EBWR REACTOR PRESSURE VESSEL REVISIONS FOR INSTRUMENTATION AND INCREASED STEAM OUTPUT, by T. L. Kettles and N. Balai. Rept. on Contract W-31-109-38. Jan 62, 59p. 4 refs.

ANL-6408 $2.00

Argonne National Lab., Ill.
HAZARD EVALUATION REPORT ON THE FAST REACTOR ZERO POWER EXPERIMENT ZPR-III, by J. K. Long, R. L. McVean, and others. Rept. on Contract W-31-109-eng-38. Oct 61, 80p. 1 ref.

ANL-6509 $1.50

Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM. Progress rept. Jan 62, on Contract W-31-109-eng-38 Feb 62, 57p. 19 refs.

ANL-6525 $1.50

Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM. Progress rept. for Feb 62, on Contract W-31-109-eng-38. 15 Mar 62, 66p. 19 refs.

ANL-6484 $0.50

Argonne National Lab., Ill.
STABILITY ANALYSIS OF EBR-II, by H. H. Hummel and L. T. Bryant. Rept. on Contract W-31-109-38. Jan 62, 18p. 10 refs.

APDA-145 $7.60

Atomic Power Development Associates, Inc., Detroit, Mich.
CONCEPTUAL DESIGN OF AN IN-PILE PACKAGE LOOP FOR SODIUM-COOLED THERMAL REACTOR FUEL TESTING. Rept. on Contract AT(11-1)-865. 15 Sep 61, 81p. 11 refs.

NAA-SR-6608 $0.50

Atomics International, Canoga Park, Calif.
CRITICAL LOADING EXPERIMENT FOR THE SRE WITH THORIUM-URANIUM FUEL, by R. Garcia and R. L. Lewis. Rept. on Contract AT(11-1)-GEN-8. 1 Mar 62, 21p. 12 refs.

NAA-SR-6890 $0.75

Atomics International, Canoga Park, Calif.
DISTRIBUTION OF FISSION PRODUCT CONTAMINATION IN THE SRE, by R. S. Hart. Rept. on Contract AT(11-1)-GEN-8. 1 Mar 62, 32p. 5 refs.

NAA-SR-6616 $1.00

Atomics International, Canoga Park, Calif.
AN EMPIRICAL PREDICTION OF TEMPERATURE GRADIENTS IN MODERATOR GRAPHITE WITHIN OPERATING NUCLEAR REACTORS, by Robert L. Carter. Rept. on Contract AT(11-1)-GEN-8. 15 Feb 62, 49p. 9 refs.

NAA-SR-6547 $0.50

Atomics International, Canoga Park, Calif.
FABRICATION OF URANIUM MONOCARBIDE FUEL ELEMENTS FOR HALLAM NUCLEAR POWER FACILITY EXPONENTIAL EXPERIMENTS, by D. H. Turner. Rept. on Contract AT(11-1)-GEN-8. 15 Feb 62, 21p. 1 ref.

NAA-SR-6527 $0.75

Atomics International, Canoga Park, Calif.
MULTI-CHANNEL BOILING STABILITY FOR SODIUM GRAPHITE REACTORS, by H. H. Cappel. Rept. on Contract AT(11-1)-GEN-8. 1 Mar 62, 36p. 8 refs.

BAW-1232 $2.25

Babcock and Wilcox Co., Lynchburg, Va.
EXPONENTIAL EXPERIMENTS ON LATTICES MODERATED BY D_2O-H_2O MIXTURES, by L. G. Barrett and J. H. Mortenson. Rept. on Contract AT(30-1)-2602. Jan 62, 80p. 13 refs.

BAW-1240 $2.50

Babcock and Wilcox Co., Lynchburg, Va.
SPECTRAL SHIFT CONTROL REACTOR BASIC PHYSICS PROGRAM. Quarterly technical rept. no. 5, July-Dec 61, on Contract AT(30-1)-2602. 119p. 27 refs.

BMI-1568 $0.75

Battelle Memorial Inst., Columbus, Ohio.
EVALUATION OF THORIUM AND THORIUM-URANIUM COMPOUNDS AS THERMAL BREEDER FUELS, by Martin S. Farkas, Arthur A. Bauer, and Ronald F. Dickerson. Rept. on Contract W-7405-eng-92. 15 Feb 62, 21p. 1 ref.

BMI-1561(Del.) $2.00

Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING DECEMBER, 1961, by Russell W. Dayton and Clyde R. Tipton, Jr. Rept. on Contract W-7405-eng-92. 1 Jan 62, 73p. 6 refs.

WAPD-T-1378(Rev. 1) $1.10

Bettis Atomic Power Lab., Pittsburgh, Pa.
PWR CORE 2 REACTOR AND ANALYTIC MODEL DESCRIPTION, PART I, by M. R. Stuart and R. T. Bayard. Rept. on Contract AT(11-1)-GEN-14. 26 Sep 61, 8p.

WAPD-255 $0.50

Bettis Atomic Power Lab., Pittsburgh, Pa.
THE RELEASE OF HELIUM FROM SLIGHTLY IRRADIATED BORON CARBIDE AND BORON CARBIDE-SILICON CARBIDE PLATES, by J. C. Clayton, W. A. Bostrom, and F. C. Schrag. Rept. on Contract AT(11-1)-GEN-14. Jan 62, 21p. 24 refs.

WAPD-243 $1.00

Bettis Atomic Power Lab., Pittsburgh, Pa.
SALT BATH HEAT TREATMENT OF PWR CORE 2 FUEL ELEMENTS, by D. Jaffe and E. F. Losco. Rept. on Contract AT(11-1)-GEN-14. Jan 62, 44p. 11 refs.

WAPD-T-1318 $2.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
THERMAL AND HYDRAULIC OPERATING PERFORMANCE OF THE SHIPPINGPORT PRESSURIZED WATER REACTOR PREDICTIONS VERSUS MEASUREMENTS, by P. A. Bickel and W. J. Gallagher. Rept. on Contract AT(11-1)-GEN-14. Oct 61, 25p. 6 refs.

CEND-147 $1.25

Combustion Engineering, Inc., Windsor, Conn.
THE DEVELOPMENT AND TESTING OF HOMOGENEOUS CERAMIC FUELS, by G. Zuromsky and W. P. Chernock. Progress rept. 1 June-30 Sept 61, on Contract AT(30-1)-2379. Oct 61, 53p. 7 refs.

CEND-141 $2.50

Combustion Engineering, Inc., Windsor, Conn.
THE DEVELOPMENT AND TESTING OF THE UO_2 FUEL ELEMENT SYSTEM, by B. E. Murtha and W. P. Chernock. Summary rept. on Contract AT(30-1)-2379. June 61, 139p. 3 refs.

DP-695 $0.50

du Pont de Nemours, E. I. and Co., Wilmington, Del.
HEAVY WATER MODERATED POWER REACTORS, comp. by R. R. Hood. Progress rept. Dec 61, on Contract AT(07-2)-1. Jan 62, 26p. 47 refs.

TID-14885 $3.60

Duquesne Light Co., Shippingport, Pa.
EXTERNAL RADIATION LEVELS OF REACTOR COOLANT LOOP PIPING AND PURIFICATION DEMINERALIZERS, CORE I, SEED 2. 1 Feb 62, 35p. DLCS 3410101-3410110. T-612076-A.

TID-14884 $8.10

Duquesne Light Co., Shippingport, Pa.
FEDAL SYSTEM OPERATION DURING STATION START-UP. 25 Jan 62, 83p. DLCS-3500261-35002132.

TID-13028 $6.60

Duquesne Light Co., Shippingport, Pa.
MONTHLY OPERATING REPORT, MAY 61. Rept. on Contract AT(11-1)-292. 70p.

TID-13198 $6.60

Duquesne Light Co., Shippingport, Pa.
MONTHLY OPERATING REPORT, JUNE 61. Rept. on Contract AT(11-1)-292. July 61, 70p. 54 refs.

TID-13436 $5.60

Duquesne Light Co., Shippingport, Pa.
MONTHLY OPERATING REPORT, JULY 61. Rept. on Contract AT(11-1)-292. 18 Aug 61, 59p.

TID-14883 $2.60

Duquesne Light Co., Shippingport, Pa.
PERIODIC CALIBRATION OF PRESSURE INSTRUMENTATION, CORE I, SEED 3. 2 Feb 62, 27p. DLCS 3360103 and DLCS-3360301.

WAPD-T-1429 $2.00

Duquesne Light Co., Shippingport, Pa.
SHIPPINGPORT ATOMIC POWER STATION: OPERATING EXPERIENCE, DEVELOPMENTS, AND FUTURE PLANS, by P. A. Fleger, I. H. Mandil, and Philip N. Ross. Dec 61, 80p. 13 refs.

GA-2691 $0.75

General Atomic Div., General Dynamics Corp., San Diego, Calif.
A PROGRAM OF RESEARCH ON MECHANICAL METALLURGY AS RELATED TO FUEL-ELEMENT FABRICATION, by T. A. Trozera, J. L. White, and R. H. Chambers. Summary rept. 1 Jan-30 Sep 61, on Contract AT(04-3)-167. 20 Oct 61, 35p. 28 refs.

GAMD-1221 $1.10

General Atomic Div., General Dynamics Corp., San Diego, Calif.
SURVEY OF FISSION PRODUCT DETECTORS FOR NUCLEAR REACTORS, by Heinz W. Georgi. Rept. on Contract AT(04-3)-314. 27 Jan 60, 10p. 13 refs.

APEX-671 $1.00

General Electric Co., Cincinnati, Ohio.
THE EFFECTS OF REACTOR FLUX ON THE SLIDING CHARACTERISTICS OF HIGH TEMPERATURE MATERIALS, by R. E. Lee, Jr. Rept. on Contracts AF 33(600) 38062 and AT(11-1)-171. Dec 61, 42p.

APEX-716 $2.00

General Electric Co., Cincinnati, Ohio.
ENGINEERING CAPABILITIES OF IN-PILE IRRADIATION FACILITIES USED BY GE-ANPD, by R. J. Harry and R. C. Fries. Rept. on Contracts AF 33(600)-38062 and AT(11-1)-171. Oct 61, 78p. 4 refs.

GEMP-106A $2.50

General Electric Co., Cincinnati, Ohio
HIGH-TEMPERATURE MATERIALS AND REACTOR COMPONENT DEVELOPMENT PROGRAMS. VOLUME I - MATERIALS. Annual rept. no. 1 on Contract AT(40-1)-2847. 28 Feb 62, 115p. 20 refs.

GEMP-106C $0.75

General Electric Co., Cincinnati, Ohio.
HIGH-TEMPERATURE MATERIALS AND REACTOR COMPONENT DEVELOPMENT PROGRAMS. VOLUME III - REACTOR COMPONENT DEVELOPMENT. Annual rept. no. 1 on Contract AT(40-1)-2847. 28 Feb 62, 35p. 20 refs.

APEX-132 $4.60

General Electric Co., Cincinnati, Ohio
SINGLE STAGE HEAT TRANSFER AND PRESSURE DROP TESTS, by Robert W. Carr, David J. Jay and others. Dec 52, declassified 16 Oct 61, 45p.

GEAP-3796 $1.75

General Electric Co., San Jose, Calif.
DESIGN, FABRICATION, AND IRRADIATION OF SUPERHEAT FUEL ELEMENT SH-4B IN VBWR, by C. N. Spalaris, R. F. Boyle and others. Rept. on Contract AT(04-3)-189. 1 Sep 61, 71p. 10 refs.

GEAP-3567 $1.25

General Electric Co., San Jose, Calif.
EFFECTS OF VERTICAL GRAVITY OSCILLATIONS ON PERFORMANCE OF THE T7 NATURAL CIRCULATION BOILING WATER REACTOR, by G. R. Pflasterer, Jr. Rept. on Contract AT(04-3)-189. 14 June 61, 52p. 9 refs.

GEAP-3775 $1.75

General Electric Co., San Jose, Calif.
FABRICATION OF FUEL RODS BY TANDEM ROLLING, by J. W. Lingafelter. Rept. on Contract AT(04-3)-361. July 61, 73p.

GNEC-154 $1.25

General Nuclear Engineering Corp., Dunedin, Fla.
BONUS REACTOR SUPERHEATER FUEL EMERGENCY COOLING. Terminal rept. under BONUS Activity no. 66-7, Contract AT(40-1)-2674. 21 Dec 60, 48p. 3 refs.

GNEC-192 $1.75

General Nuclear Engineering Corp., Dunedin, Fla.
BONUS SUPERHEATER ASSEMBLY SEAL CONNECTOR DEVELOPMENT. Terminal rept. on Insulation and Seal Connector Development, Contract AT(11-1)-795. 11 Sep 61, 69p.

GNEC-177 $1.25

General Nuclear Engineering Corp., Dunedin, Fla.
BONUS SUPERHEATER FUEL ASSEMBLY UNFLOODING TEST. Rept. on Contract AT(11-1)-795. 15 June 61, 51p.

GNEC-187 $1.00

General Nuclear Engineering Corp., Dunedin, Fla.
ENGINEERING PHYSICS METHOD FOR DETERMINING NEUTRON PENETRATION IN IRON-WATER SHIELDS. Rept. on Contract AT(40-1)-2674. 11 Aug 61, 38p. 15 refs.

HW-67792 $1.00

Hanford Atomic Products Operation, Richland, Wash.
EXPERIMENTAL EVALUATION OF THE COMBUSTION HAZARD TO THE EXPERIMENTAL GAS-COOLED REACTOR-PRELIMINARY BURNING RIG EXPERIMENTS, by R. E. Dahl. Rept. on Contract AT(45-1)-1350. Nov 61, 40p. 5 refs.

HW-72217 $2.75

Hanford Atomic Products Operation, Richland, Wash. FUEL CYCLE ANALYSIS FOR SUCCESSIVE PLUTONIUM RECYCLE. I. RESULTS FOR FIVE REACTOR CONCEPTS, by E. A. Eschbach, D. E. Deonigi and others. Rept. on Contract AT(45-1)-1350. Feb 62, 158p. 48 refs.

HW-67679 $0.75

Hanford Atomic Products Operation, Richland, Wash. HIGH FREQUENCY RESISTANCE WELDING OF SPACER RIBS TO ZIRCALOY-2-CLAD UO_2 FUEL COMPONENTS, by L. R. Vancott. Rept. on Contract AT(45-1)-1350. Oct 61, 30p. 11 refs.

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Hanford Atomic Products Operation, Richland, Wash. k_{oo} OF THREE WEIGHT PERCENT U^{235} ENRICHED UO_3 AND $UO_2(NO_3)_2$ HYDROGENOUS SYSTEMS, by V. I. Neeley, J. A. Berberet, and R. H. Masterson. Rept. on Contract AT(45-1)-1350. Sep 61, 47p. 17 refs.

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Hanford Atomic Products Operation, Richland, Wash. THE LIQUIDUS FOR THE SYSTEM UO_2-PuO_2, by T. D. Chikalla. Rept. on Contract AT(45-1)-1350. June 61, 22p. 24 refs.

HW-69808 $1.00

Hanford Atomic Products Operation, Richland, Wash. THE MULTI-DECADE SIMULATION OF THE PLUTONIUM RECYCLE PROGRAM CRITICAL FACILITY, by G. R. Taylor. Rept. on Contract AT(45-1)-1350. 1 June 61, 37p. 3 refs.

HW-71812 $2.00

Hanford Atomic Products Operation, Richland, Wash.
QUICK: A SIMPLIFIED FUEL COST CODE, by E. A. Eschbach, D. E. Deonigi, and S. Goldsmith. Rept. on Contract AT(45-1)-1350. 2 Jan 62, 77p.

HW-69305 $0.50

Hanford Atomic Products Operation, Richland, Wash. THE SYSTEM PuO_2-ZrO_2, by D. F. Carroll. Rept. on Contract AT(45-1)-1350. Apr 61, 19p. 10 refs.

IDO-19302 $2.00

Idaho Operations Office, Atomic Energy Commission, Idaho Falls.
NUCLEAR INCIDENT AT THE SL-1 REACTOR JANUARY 3, 1961 AT THE NATIONAL REACTOR TESTING STATION. Jan 62, 204p.

LA-2654 $2.25

Los Alamos Scientific Lab., N. Mex.
THE PERIOD EQUILIBRIUM EFFECT IN REACTOR DYNAMICS, by Sidney Singer. Rept. on Contract W-7405-eng-36. 5 Mar 62, 102p.

MND-P-2581-III $3.50

Martin Co., Baltimore, Md.
ISOTOPIC POWER SOURCES. A COMPENDIUM, comp. by E. H. Smith. Property and processes review part I. Rept. on Contract AT(30-3)-217. June 61, 260p. 2063 refs.

MLM-1127 $1.75

Mound Lab., Miamisburg, Ohio.
NUCLEAR BATTERY-THERMOCOUPLE TYPE SUMMARY REPORT, by B. C. Blanke, J. H. Birden and others. Rept. on Contract AT(33-1)-GEN-53. Jan 62, 68p. 32 refs.

PB 156 718 $4.60

Nepa Div., Fairchild Engine and Airplane Corp., Oak Ridge, Tenn.
THERMAL STRESS TESTS OF KS GRAPHITE, by A. R. Crocker. 19 July 49, declassified 31 Oct 60. 42p. 28 refs. NEPA 1125-EXR-2.

DESCRIPTORS: Fuel elements, Materials, *Graphite, Thermal stresses, Stresses, Rupture, Tests, Simulation.

A program was formulated to determine the thermal rupture characteristics of KS graphite under steady state operating conditions simulating the thermal conditions of an uninhabited guided missile reactor. The first part of the program was directed toward testing tubular shaped specimens with the intent to complement this work with tests to study the effect of fuel element shape on the thermal rupture characteristics.

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Oak Ridge Gaseous Diffusion Plant, Tenn.
BACK DIFFUSION IN LABYRINTH SEALS, by H. C. Sanderson. 23 Oct 61, 15p. 1 ref. KL-1188.

ORNL-3231 $1.50

Oak Ridge National Lab., Tenn.
ARMY REACTORS PROGRAM. Progress rept. on Contract W-7405-eng-26. Mar 62, 53p.

ORNL-3210 $3.50

Oak Ridge National Lab., Tenn.
GAS-COOLED REACTOR PROGRAM. Quarterly progress rept. for period ending 30 Sep 61, on Contract W-7405-eng-26. 260p. 46 refs.

ORNL-3222 $1.75

Oak Ridge National Lab., Tenn.
IN-PILE LOOP IRRADIATION OF AQUEOUS THORIA-URANIA SLURRY AT ELEVATED TEMPERATURE. DESIGN AND IN-PILE OPERATION OF LOOP L-2-27S, by H. C. Savage, E. L. Compere and others. Rept. on Contract W-7405-eng-26. Mar 62, 72p. 13 refs.

ORNL-3117 $3.60

Oak Ridge National Lab., Tenn.
INTERDIFFUSION OF HELIUM AND ARGON IN SPEER MODERATOR NO. 1 GRAPHITE. (A TERMINAL REPORT ON LARGE-PORE GRAPHITES - EXPERIMENTAL PHASE), by Jack Truitt. Rept. on Contract W-7405-eng-26. 26 June 61, 33p. 16 refs.

IDO-16636 $1.25

Phillips Petroleum Co., Idaho Falls.
REVIEW OF SEVERAL MODELS FOR POWER BEHAVIOR AND REACTIVITY FEEDBACK IN REACTOR EXCURSION STUDIES, by R. W. Garner. Rept. on Contract AT(10-1)-205. 6 Feb 62, 51p. 8 refs.

IDO-16743 $2.75

Phillips Petroleum Co , Idaho Falls.
SPERT III PRESSURIZER VESSEL FAILURE, by R. E. Heffner, T. R. Wilson and others. Rept. on Contract AT(10-1)-205. 29 Jan 62, 195p. 5 refs.

RAI-200 $4.60

Radiation Applications, Inc., Long Island City, N. Y.
THE TECHNOLOGY AND APPLICATIONS OF LARGE FISSION PRODUCT BETA SOURCES. Quarterly rept. 1 Oct-31 Dec 61, on Contract AT(30-1)-2186. 18 Jan 62, 49p.

NYO-9064 $3.00

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FUEL ELEMENT DEVELOPMENT PROGRAM FOR THE PEBBLE BED REACTOR. Final rept. on Contract AT(30-1)-2378. 30 Apr 61, 221p. 26 refs.

UCRL-13029 $4.60

Stanford Research Inst., Menlo Park, Calif.
A STUDY OF SOME CRATERING CRITERIA FOR PROJECT CHARIOT, by L. M Swift. Final rept. on Subcontract 122. 31 Jan 61, 45p. 17 refs. SRI proj. no. SD-2842.

TID-11307 $11.00

Thompson Ramo Wooldridge Inc., Cleveland, Ohio.
MERCURY MATERIALS EVALUATION AND SELECTION, Snap II Power Conversion System topical rept. no. 7, 26 Oct 60, 144p. ER-4103.

ORO-501 $2.00

Union Carbide Metals Co., Niagara Falls, N. Y.
COLUMBIUM ALLOY CLAD URANIUM CARBIDE FUEL ELEMENT, by M. Korchynsky, J. J. Finley and others. Rept. on Contract AT(40-1)-2559. 15 Sep 61, 86p. 11 refs.

WCAP-4059 $1.60

Westinghouse Electric Corp., Pittsburgh, Pa.
CVTR PROJECT. CAROLINAS VIRGINIA NUCLEAR POWER ASSOCIATES, INC. Monthly progress rept. Sep 61, on Contract AT(30-1)-2289. 19p.

WCAP-4060 $1.60

Westinghouse Electric Corp., Pittsburgh, Pa.
CVTR PROJECT. CAROLINAS VIRGINIA NUCLEAR POWER ASSOCIATES, INC. Monthly progress rept. for Oct 61, on Contract AT(30-1)-2289. 17p.

WCAP-4061 $2.60

Westinghouse Electric Corp., Pittsburgh, Pa.
CVTR PROJECT. CAROLINAS VIRGINIA NUCLEAR POWER ASSOCIATES, INC. Monthly progress rept. for Nov 61, on Contract AT(30-1)-2289. 21p.

WCAP-4062 $2.60

Westinghouse Electric Corp., Pittsburgh, Pa.
CVTR PROJECT. CAROLINAS VIRGINIA NUCLEAR POWER ASSOCIATES, INC. Monthly progress rept. for Dec 61, on Contract AT(30-1)-2289. 21p.

Nuclear Reactions

TID-14206 $11.00

Bartol Research Foundation [Franklin Inst.] Swarthmore, Pa.
CALCULATIONS OF INELASTIC NEUTRON CROSS SECTIONS FOR EVEN-EVEN NUCLEI, A 46-100, by R. W. Jackiw, M. A. Rothman and D. M. Van Patter. Rept. on Contract AT(30-1)-1679. 25 Sep 61, 141p. 18 refs.

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Florida U., Gainesville.
THE INTERACTION OF TRITONS WITH MATTER, by William Newberry Bishop. Doctoral Thesis. June 61, 100p. 46 refs.

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SHIELDING COMPUTER PROGRAMS 14-0 AND 14-1 REACTOR SHIELD ANALYSIS, by J. T. Martin, J. P. Yalch and W. E. Edwards. Rept. on Contract (AT(11-1)-171). 23 Jan 59, 190p. XDC-59-2-16.

ORNL-3240 $2.25

Oak Ridge National Lab., Tenn.
THE DISTORTED-WAVE THEORY OF DIRECT NUCLEAR REACTIONS I: "ZERO-RANGE" FORMALISM WITHOUT SPIN-ORBIT COUPLING, AND THE CODE SALLY, by R. H. Bassel, R. M. Drisko, and G. R. Satchler. Rept. on Contract W-7405-eng-26. Mar 62, 100p. 29 refs.

TID-14186 $4.60

Ohio State U. Research Foundation, Columbus.
DEUTERON-INDUCED REACTIONS, by H. J. Hausman. Annual rept. no. 5, 1 Oct 60-30 Sep 61, on Contract AT(11-1)-503. 27 Oct 61, 42p. 18 refs. OSURF-735-5

TID-14241 $1.60

Washington U., St. Louis, Mo.
STUDIES OF LOW-ENERGY NUCLEAR REACTIONS IN MEDIUM MASS NUCLEI - DECAY SCHEME STUDIES. Technical progress rept. 15 Nov 60-14 Nov 61, on Contract AT(11-1)-870. 20p. 8 refs.

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Yale U., New Haven Conn.
VIRTUAL COULOMB EXCITATION IN THE NUCLEON TRANSFER PROCESS, by G. Breit. Rept. on Contract AT(30-1)-1807. 11 Dec 61, 22p. 13 refs.

Radioactivity

TID-13523 $1.60

Duquesne Light Co., Shippingport, Pa.
ENVIRONMENTAL RADIATION MONITORING. Quarterly rept. Apr-June 61. 20p.

HASL-121 $0.50

Health and Safety Lab., Atomic Energy Commission, New York
PRELIMINARY DATA ON FALLOUT FROM THE FALL 1961 USSR TEST SERIES. 27 Feb 62, 8p.

PB 159 837-1 $7.60

Naval Radiological Defense Lab., San Francisco, Calif.
ESTIMATING COST AND EFFECTIVENESS OF DECONTAMINATING LAND TARGETS. VOLUME I: ESTIMATING PROCEDURE AND COMPUTATIONAL TECHNIQUE, by H. Lee. 6 June 60, 73p. 18 refs. Research and development technical rept. USNRDL-TR-435; AD-245 487.

DESCRIPTORS: Surface targets, *Decontamination, Costs, Numerical methods and procedures, *Dose rate, Reduction, Radiation tolerance, Radioactive fall-out.

The reclamation of an area contaminated by fallout centers about the reduction, by means of decontamination, of the radiation hazard to tolerable levels, so that the usefulness of the area may be restored. Radiation tolerances are given in terms of exposure dosages over given periods of time. Decontamination must be planned with consideration of the time necessary or available for recovery, so that exposure dose limits will not be exceeded. A study is presented to determine (1) how, by means of a dose rate multiplier curve, a target complex computational technique, and decontamination data, the earliest entry times may be found for any standard initial intensity and any exposure dose limit; and (2) for any entry time, the effectiveness required and the cost in terms of manpower, supplies, and accrued dose for the best suited decontamination procedure may be estimated. A procedure is explained for estimating the cost and effectiveness of decontaminating real target areas with planning guides and associated information on how to do so. The procedure is illustrated for the case of a small area. (Author)

PB 159 862 $1.60

Naval Radiological Defense Lab., San Francisco, Calif.
GAMMA-RAY SPECTRUM OF Te^{131}, by J. M. Ferguson and F. M. Tomnovec. 12 Dec 60, 16p. 11 refs. Research and development technical rept. USNRDL-TR-490; AD-249 579.

DESCRIPTORS: *Tellurium, *Radioactive isotopes, Gamma rays, *Gamma ray spectroscopy, Iodine, *Radioactive decay.

The gamma-ray spectrum of 25-minute Te^{131} was investigated with scintillation spectrometers. Gamma rays with energies of 0.145, 0.445, 0.604, 0.940, 0.985, and 1.13 Mev were found, and their relative abundances were measured. The 0.445 and 0.985 Mev gammas are in coincidence with the 0.145 Mev gamma ray. A decay scheme is proposed with I^{131} levels at 0.145, 0.604, 0.940 and 1.13 Mev. (Author)

PB 158 882 $9.60

Naval Radiological Defense Lab., San Francisco, Calif.
PROPOSED DECAY SCHEMES FOR SOME FISSION-PRODUCT AND OTHER RADIONUCLIDES, by C. F. Miller. 27 May 57, 114p. 87 refs. Research and development technical rept. USNRDL-TR-160; AD-149 097.

DESCRIPTORS: *Fission products, *Radioactive isotopes, *Radioactive fall-out, Hazards, Gamma rays, *Radioactive decay, Gamma emission, Photons.

The available decay scheme data for some fission-product radionuclides and other radionuclides up to about November 1956 has been used to compute numerical estimates of (1) the total photon energy emitted per disintegration, (2) the average photon energy, (3) the number of photons (with energy of 20 Kev or greater) emitted from the atom per disintegration, and (4) the energy per disintegration carried by each photon. Besides the decay schemes for the 37 fission-product radionuclides for which not enough data could be found to determine the total disintegration energy, the schemes for some 36 addition radionuclides were obtained by attempting to reconcile conflicting reported data, by estimating unmeasured quantities such as conversion coefficients, or by estimating missing values for incomplete data. With better detecting facilities and better methods of calibrating existing counters and spectrometers now available, it should be possible to improve the present decay scheme data as necessary to obtain their transition and emission energy summations. With improved data, these summations could also be improved to give a better definition of the gamma hazard, as well as the beta and alpha hazards, for each radionuclide and, thereby a better definition of the over-all hazards from radioactive fallout. This kind of information is necessary for the design and evaluation of adequate radiological countermeasures. (Author)

PB 158 883 $5.60

Naval Radiological Defense Lab., San Francisco, Calif.
TRANSPORT OF PARTICULATE MATTER ON A NEAR HORIZONTAL, IDEAL SURFACE, by R. H. Heiskell, R. J. Crew, and A. J. Guay. 21 Aug 59, 54p. 13 refs. Research and development technical rept. USNRDL-TR-360; AD-234 360.

DESCRIPTORS: *Radiological contamination, *Decontamination, Water, Erosion, Hydrology, Velocity, Countermeasures, *Radioactive fallout, *Particles, Atomic bomb explosions.

A series of tests was started to determine the optimum and limiting considerations for the transport of particulate matter by water films. It was found that a water flow rate of 5.1 gpm/ft of width is required to transport spherical particles from 60 to 590μ in diameter and a density of 4.35. A water flow rate of only 4.0 gpm/ft of width is required to transport the 2.53 density spheres. A flow rate of 7.32 gpm/ft of width was required to transport silica particles from 60 to 590μ in size and a density of 2.63. A mass loading of 1 gm/ft^2 of the 500 to 590μ particles is the maximum loading which can be moved efficiently at this slope, 6.5×10^{-4}. A maximum of 5 g/sq ft of the 250 to 294μ particles could be transported. Limited tests on the effect of obstructions in the path of the water flow showed that the transport effectiveness is greatly reduced by the induced eddy currents which actually cause the particles to move up stream behind the obstruction. (Author)

PB 158 884 $3.60

Naval Radiological Defense Lab., San Francisco, Calif.
TRANSPORT OF PARTICULATE MATTER ON AN IDEAL SURFACE AT 0.02 SLOPE, by R. H. Heiskell, R. J. Crew and others. 8 Mar 60, 36p. 1 ref. Research and development technical rept. USNRDL-TR-404; AD-236 417.

DESCRIPTORS: *Radioactive fall-out, Countermeasures, *Decontamination, Water, Films, Tests, *Particles.

Tests to determine the optimum and limiting considerations for the transport of particulate matter by water films show that conventional laminar flow theory does not hold for thin water films at a slope of 0.02. At this slope all sizes of both spherical and irregularly shaped silica particles were transported by flow rates as low as 0.72 gpm/ft of width. 137-micron diameter silica particles were the most difficult to transport. The maximum transport achieved for this size was 15 to 96 g/sq ft per minute with a flow-rate of 0.72 to 3.96 gal/min/ft of width. The smallest diameter of the spherical particles gave the lowest maximum loading rate. The maximum transport, at a flow rate of 3.96 gal/min/ft of width, ranged from 20 to 440 g/sq ft/min for 68 to 460 micron diameter spheres. (Author)

PB 158 885 $3.60

Naval Radiological Defense Lab., San Francisco, Calif.
WATER TRANSPORT OF PARTICULATE MATTER ON AN IDEAL SURFACE AT 0.04 SLOPE, by R. H. Heiskell, R. J. Crew and others. 29 May 60, 39p. 2 refs. Research and development technical rept. USNRDL-TR-416; AD-239 673.

DESCRIPTORS: *Decontamination, *Particles, *Radioactive fallout, Water, Films, Hydrology.

Tests were made to determine the optimum and limiting considerations for the transport of particulate matter by water films. It was found that conventional laminar flow theory does not hold for thin water films at a slope of 0.04. At this slope both spherical and irregularly shaped silica particles of diameters up to 590 microns were transported with flow rates as low as .37 gpm/ft of width. The maximum amount of this size range which could be transported was 30 to 800 g/sq ft/min for flow rates of 0.37 to 3.96 gpm/ft of width. The maximum amount of 68-micron diameter spherical particles that could be transported was 20 to 140 g/sq ft/min for flow rates of 0.37 to 2.70 gpm/ft of width. The rate of individual particle transport rate at this slope can be computed from the empirical equation $U = 0.000328\ D\ (\sqrt{Q} - .069) + .003$ for spherical particles and $U = .000805\ D\ (\sqrt{Q} - .480) + .021$ for irregular particles where U = particle velocity in ft/sec, Q = water flow rate in gpm/ft of width and D = diameter of particles to be transported in microns. The reduction of surface tension of the water increases the transport velocity of particles and the maximum mass that can be transported. (Author)

PB 158 886 $2.60

Naval Radiological Defense Lab., San Francisco, Calif.
WATER TRANSPORT OF PARTICULATE MATTER ON AN IDEAL SURFACE AT 0.08 SLOPE, by R. H. Heiskell and R. J. Crew. 7 July 60, 28p. 4 refs. Research and development technical rept. USNRDL-TR-436; AD-247 313.

DESCRIPTORS: *Decontamination, *Particles, *Radioactive fall-out; Water; Films; Hydrology; Erosion.

Conventional laminar-flow theory does not hold for thin water films at a slope of 0.08. The individual particle transport rate at this slope can be computed from the empirical equation $U=0.000520D(\sqrt{Q}-0.069)+0.01$ for the spherical particles and the velocity of irregularly shaped silica particles can be expressed as $U=0.001278D(\sqrt{Q}-0.480)+0.05$ where U = particle velocity in ft/sec, Q = water flow rate in gpm/ft of width and D = diameter of particles to be transported in microns. The 137-micron size irregular particle gave which could be transported ranged from 150 to 2450 g/ft^2/min for flow rates of 0.37 to 2.70 gpm/ft of width. The maximum loading rate for the 68-micron diameter spheres was 50 to 1600 g/ft^2/min for flow rates of 0.37 to 1.83 gpm/ft of width. (Author)

PB 158 887 $2.60

Naval Radiological Defense Lab., San Francisco, Calif.
WATER TRANSPORT OF PARTICULATE MATTER ON AN IDEAL SURFACE AT 0.165 SLOPE, by R. H. Heiskell, R. J. Crew, and S. Salkin. 7 July 60, 22p. 4 refs. Research and development technical rept. USNRDL-TR-437; AD-246 582.

DESCRIPTORS: *Decontamination, Water, Particles, *Radioactive fallout, Films, Fluid flow, Sedimentation *Hydrology.

Tests were conducted to determine the optimum and limiting considerations for the transport of particulate matter by water films. At 0.165 slope all flows from 0.195 to 2.70 gpm/ft of width were supercritical. The water surface was turbulent and large irregularly shaped waves moved swiftly down the plane. The friction factor was essentially constant for all flows. All sizes of both spherical and irregularly shaped particles up to 590 microns were transported with flow rates as low as 0.195 gpm/ft of width. The maximum amount of the 68 micron size of both particles which could be transported was approximately 400 tc 4500 Grams per sq ft per min for a fow rate of 0.195 to 0.72 gpm/ft of width. (Author)

AD-256 604 Available on loan only

USAF Radiation Lab., U. of Chicago, Ill.
QUARTERLY PROGRESS REPORT NO. 39, by Kenneth P. DuBois. Rept. on Contract AF 41(657)252. 15 Apr 61, 167p. 115 refs.

DESCRIPTORS: *Tissues (Biology), *Mammals, *Radiation effects, Radiation injuries, Intestine, *Hemopoiesis, Nitrogen mustards, Biochemistry, Hormones, Glucose tolerance, Hydrogen ion concentration, Fast Neutrons, Gamma rays, Rare earth compounds, X-rays, Oxidases, *Drugs, Survival, Pharmacology, *Radiobiology, Enzymes, Life expectancy, Countermeasures.

Contents.
The effects of ionizing radiations on the biochemistry of mammalian tissues
The influence of exposure to low levels of gamma and fast neutron irradiation on the life span of animals
Pharmacological and toxicological compounds as protective or therapeutic agents against radiation injury in experimental animals.

Waste Disposal

HW-72324 $1.00

Hanford Atomic Products Operation, Richland, Wash.
RESEARCH AND DEVELOPMENT ACTIVITIES: FIXATION OF RADIOACTIVE RESIDUES, by E. R. Irish. Quarterly progress rept. Oct-Dec 61, on Contract AT(45-1)-1350. 15 Jan 62, 32p.

PB 159 107 $1.10

Naval Radiological Defense Lab., San Francisco, Calif.
THE POSSIBLE USE OF MEROMICTIC LAKES FOR THE DISPOSAL OF RADIOACTIVE WASTES, by C. L. Newcombe. 23 Aug 57, 7p. 14 refs. Reviews and Lectures no. 38.

DESCRIPTORS: *Radioactive waste disposal, Lakes, Michigan, Hydrology.

TID-13942 $1.50

Southwest Research Inst., San Antonio, Texas
STRENGTH TESTS OF PROTOTYPE SEA DISPOSAL CONTAINERS FOR RADIOACTIVE WASTES, by Jack R. Pohlman and M. M. Lemcoe. Final rept. on Contract AT (30-1)-2647. 20 Oct 61, 58p.

IDO-14570 $0.50

Phillips Petroleum Co., Idaho Falls.
STAINLESS STEEL WASTES: III. LABORATORY STUDIES OF THE RATE OF REMOVAL OF STAINLESS STEEL IONS BY MERCURY CATHODE ELECTROLYSIS, by D. R. Anderson and D. W. Rhodes. Rept. on Contract AT(10-1)-205. 12 Feb 62, 21p. 7 refs.

ORNL-3182 $1.00

Oak Ridge National Lab., Tenn.
EVALUATION OF SOLID WASTE DISPOSAL AT ORNL: II, by T. F. Lomenick and K. E. Cowser. Status rept. on Contract W-7405-eng-26. Mar 62, 41p. 5 refs.

Order from GPO $2.50 as D 101.52/2: 961/v. 3

Army Research Office, Washington, D. C.
ARMY RESEARCH TASK SUMMARY, FISCAL YEAR 1961. VOLUME 3. PHYSICS. 551p.

DESCRIPTORS: *Physics, Atomic energy engineering, Electricity, Magnetism, Fluid mechanics, Heat, Thermodynamics, Instrumentation, Light, Optics, Mechanics, Nuclear physics, Plasma physics, Solid state physics, Sound, Acoustics, Theory, *Military research.

Contents:
Physics
Atomic & molecular physics
Electricity and magnetism
Fluid mechanics
Heat and thermodynamics
Instrumentation (Physics)
Light and optics
Mechanics (except solid state)
Nuclear physics
Plasma physics
Solid state physics
Sound and acoustics
Theoretical physics
(See also PB 171 002, Pb 171 003)

TID-13957 $5.60

Institute of Mathematical Sciences, New York U., N. Y.
MICROSCOPIC AND MACROSCOPIC MODELS IN PLASMA PHYSICS, by Harold Grad. Rept. on Contract AT(30-1)-1480. 15 Aug 61, 54p. 23 refs. MF-19.

NYO-9757 $8.60

Institute of Mathematical Sciences, New York U., N. Y.
SOUND PROPAGATION ACCORDING TO KINETIC MODELS, by Lawrence Sirovich and James Thurber. Rept. on Contract AT(30-1)-1480. 15 Aug 61, 96p. 16 refs. MF-18.

AD-269 076 $1.10

Maryland U., College Park.
THE FERMI SURFACE FOR AN INTERACTING ELECTRON GAS, by Peter Fulde. Rept. on Contract AF 49(638)399. July 61, 8p. 4 refs. Technical rept. 218; AFOSR-1808.

DESCRIPTORS: *Electrons, Gases, Spheres, Surface properties, Vacuum systems, Polarization, Dielectrics, Perturbation theory, Green's function.

Migdal's theorem is applied to the explicit evaluation in the high density (weak coupling) limit of the Fermi surface discontinuity in the momentum distribution of the degenerate electron gas. The magnitude of the jump is reduced from unit by the amount $0.17r_s$, where r_s is the usual unit sphere radius. This result agrees with an expression obtained by Daniel and Vosko from the Gell-Mann-Brueckner method. (Author)

ORO-500(Vol. 1) $4.60

Miami U., Coral Gables, Fla.
PLASMA PHYSICS BULLETIN, by Harry S. Robertson, M. A. Hakeem and others. Rept. on Contracts AT(40-1)-2454, AT(40-1)-2762 and AF19(604)-8082. Sep 61, 40p. 6 refs.

PB 159 829 $2.60

Michigan U. [Ann Arbor].
ELECTROMAGNETIC RADIATION FROM A SOURCE IN A PLASMA, by G. W. Ford. 1960, 28p. 13 refs. AD-254 049.

DESCRIPTORS: *Plasma physics, Distribution, *Electromagnetic waves, Magnetic fields, *Electromagnetic theory, Electric currents, Integral transforms, Differential equations.

Contents:
Elimination of the longitudinal field
Solution of the equation of the dielectric displacement field (transverse) for asymptotic fields far from the source of radiation
The low frequency limit
Radiation from a radial charge burst.

TID-14306 $2.60

New Mexico U., Albuquerque, N. Mex.
THE EXPLODING WIRE AS FAST DYNAMIC PINCH, by J. Katzenstein and M. Sydor. Final technical rept. on Contract AT(11-1)-983. 31 July 61, 26p. 12 refs.

TID-13434 $1.10

New York U., N. Y.
THE USE OF ATOMIC BEAMS AS A PROBE FOR STUDYING LOW DENSITY PLASMAS. Quarterly rept. 1 April-31 July 61, on Contract AT(30-1)-2397. 24 Aug 61, 6p.

PB 159 820 $3.60

Northwestern U., Evanston, Ill.
THEORY OF TRANSPORT COEFFICIENTS. I. GENERAL THEORY AND ELECTRICAL CONDUCTIVITY OF ELECTRON-PHONON SYSTEM, by S. Fujita and R. Abe. Technical rept. no. 6 on Contract Nonr-1228(13). [1961] 31p. 14 refs. AD-254 598.

DESCRIPTORS: Electrical conductance, Theory, *Electrons, *Phonons, Particles, Thermodynamics, Solid state physics, *Transport properties, Perturbation theory.

A general method is presented for the calculation of static transport coefficients based on Kubo's formulas. Techniques of perturbation expansion, diagram representation, and linked-cluster expansion are used. As an example, the electrical conductivity of an electron-phonon system is calculated with the natural introduction of irreversibility, following the ideas of Van Hove, (Physica 21:517, 1955; 23:441, 1957), Prigogine and his collaborators (Non-equilibrium

Statistical Mechanics, Interscience, New York, 1961; and Physica 22:621, 1956; 25:281, 1959; 25:302, 1959; 26:145, 1960). Under certain conditions the present method is shown to be equivalent to the conventional method by means of the Boltzmann equation. These conditions are examined and the improvement of the approximation is discussed. (Author)

ORNL-3246 $0.50

Oak Ridge National Lab., Tenn.
"THE PLASMA EATER:" A DEVICE TO MEASURE THE RATE OF FLOW OF A PLASMA, by I. Alexeff and R. V. Neidigh. Mar 62, 14p.

ORNL-3239 $2.25

Oak Ridge National Lab., Tenn.
THERMONUCLEAR DIVISION PROGRESS REPORT 1 FEBRUARY-31 OCTOBER 1961, on Contract W-7405-eng-26. [1962] 108p. 103 refs.

PB 159 690 $3.60

Physics Research Lab., U. of Illinois, Urbana
BREMSSTRAHLUNG CONVERTER CONSIDERATIONS, by P. Axel. Technical rept. no. 22 (Supplement to Technical rept. no. 21) on Contract Nonr-1834(05). Mar 61, 32p. 5 refs. AD-254 127.

DESCRIPTORS: *Bremsstrahlung, *Targets, Materials, Electron beams, Electron bombardment, Energy, Scattering.

The choice of the proper converter (i. e., bremsstrahlung target) thickness and the proper converter material depends on both the experiment being performed and on the backgrounds. Any choice will be a compromise between the factors listed below. In many cases, some relatively obvious alternatives will have both positive and negative features. It is quite likely that no decisive feature will emerge, and that one alternative will be chosen arbitrarily in preference to spending the excessive times probably necessary to find the optimum condition experimentally. (Author)

TID-14105 $4.60

Plasma Physics Lab., Princeton U., N. J.
INSTRUCTION BOOK FOR THE 4 mm AND 8 mm ELECTRON DENSITY MEASURING SYSTEMS, by W. P. Ernst. Technical memorandum no. 92, on Contract AT(30-1)-1238. 7 Mar 60, 43p. Project Matterhorn.

TID-14357 $3.60

Rensselaer Polytechnic Inst., Troy, N. Y.
A VARIATIONAL PRINCIPLE FOR POTENTIAL SCATTERING, by G. H. Goedecke and E. Brown. Rept. on Contract AT(30-1)-1955. Mar 62, 37p. 36 refs.

SCR-308 $0.75

Sandia Corp., Albuquerque, N. Mex.
OPTICAL INSPECTION DEVICE USING FIBER OPTICS. Final rept. Apr-Aug 61. Feb 62, 28p.

NYO-9807 $1.10

Westinghouse Research Labs., Pittsburgh, Pa.
ULTRAHIGH VACUUM TECHNIQUES. Quarterly progress rept. 1 July-30 Sep 61, on Contract AT(30-1)-2823. 13 Nov 61, 9p. 7 refs. WRL research rept. 808-D804-R1.

Electricity and Magnetism

TID-13720 $3.60

Cambridge Electron Accelerator, Harvard U., Mass.
MAGNETIC MEASUREMENTS OF THE 48 SYNCHROTRON MAGNETS, by J. dePagter and H. Winick. 15 Dec 60, 38p. CEA-83

PB 159 863 $6.60

Indiana Steel Products Co., Valparaiso.
[PERMANENT MAGNET MATERIALS] by J. R. Ireland. Summary technical rept. 15 Mar 60-14 Nov 61, on Contract AF 33(616)7287. [1961] 61p. 27 refs.

DESCRIPTORS: Cobalt, Iron, Mercury, *Magnets, Production, Stability, Materials, Ferromagnetic materials, Manganese alloys, Aluminum alloys, Nickel alloys, Cobalt alloys, Alloys, Casting, Heat treatment, Deformation, Magnetic properties, Temperature, Precipitation, Crystal structure, Vacuum apparatus, Evaporators, Operation.

A mercury matrix magnet was produced which had a $(B_dH_d)max = 5.84 \times 10^6$ G. Oe. A method was discovered to increase coercive force of mercury matrix magnets. The plating assembly was changed in order to increase the amount of iron cobalt particles by factor of 2. An outline of the process which produced the best magnets is given. Ferromagnetic manganese-aluminum alloys were cast, heat treated, and deformed in various ways to obtain high magnetic properties Various parameters in the making of the magnets were investigated, and the best procedures are listed. Temperature effects on remanence are given for the range from -60° to 100°C. Electron micrographs show the slip lines developed in swaged Mn-Al. A high-quality vacuum evaporator was obtained which can evacuate a 122-quart bell jar to 2×10^{-6} torr in four minutes. The magnetic and physical stability of Lodex magnets, fine iron-cobalt compacts, was tested. Remanence, under stable environmental conditions at room temperature changes 0.24% per log cycle of time after magnetization. Alnico V_{ZF}, V-7, VI and VIII was exposed to temperatures above 550°C for 1000 hours. The remanence changes of differently shaped samples have been measured and reported. (Author)

PB 159 734 $1.60

Institute [of] Molecular Physics, U. of Maryland, College Park.
POTENTIAL ENERGY CURVES FOR THE $X^1\Sigma_g^+$ AND $B^1\Sigma_u^+$ STATE OF HYDROGEN, by Irwin Tobias and Joseph T. Vanderslice. Technical rept. no. 1 on Contract Nonr-595(14). 27 Mar 61, 19p. AD-253 288.

DESCRIPTORS: *Energy, *Hydrogen, Excitation, Molecules, *Atomic energy levels, Quantum mechanics, Dissociation, Mathematical analysis, Mass spectroscopy.

The recently reported accurate data of Herzberg and Howe have been used to calculate the potential energy curves for the $X^1\Sigma_g^+$ and $B^1\Sigma_u^+$ states of hydrogen by the Rydberg-Klein-Rees (RKR) method. The results are compared with the results of the quantum calculations of Kolos and Roothaan and Dalgarno and Lynn. The agreement is good; in fact, the interaction energy obtained by Dalgarno and Lynn for the ground state agrees with the RKR values to within 2% in the region where the two curves overlap. The rotational predissociation observed in the v'' equal to the 14 level of the $X^1\Sigma_g^+$ state is discussed. It appears as if there exists here the unusual case of a sharp spectral line associated with a state which is very close in energy to the maximum of a potential barrier. (Author)

PB 159 678 $2.60

Mallinckrodt Chemical Lab., Harvard U., Cambridge, Mass.
INTERNAL ROTATION OF CIS 2,3-EPOXYBUTANE FROM THE MICROWAVE SPECTRUM, by Martin L. Sage. Doctoral thesis. Rept. on Contract Nonr-1866(14). [1961] 26p. 12 refs. AD-254 230.

DESCRIPTORS: *Butenes, *Oxides, *Butanes, *Microwave spectroscopy, Dipole moments, Molecular rotation, Measurement, Theory.

The microwave spectrum of cis 2,3-epoxybutane was investigated in the region from 8,000 - 29,000 mc. The spectrum consists of singlets and triplets. The ground torsional state shows a pseudo rigid rotor spectrum consists of singlets and triplets. The ground torsional state shows a pseudo rigid rotor spectrum with rotational constants 8057.71, 4461.36, and 3468.60 mc. The triplets yield a barrier to internal rotation of 1607 $\pm$ 150 cal/mole independent of a range of assumptions concerning the coupling of the two methyl groups. The dipole moment was found to be 2.03 $\pm$ 0.02 D. with 2.01 $\pm$ 0.02 D. in the plane of the ring. A group theoretical discussion of double rotors with one rotor on each side of a plane of symmetry is given. (Author)

PB 159 680 $1.60

Mallinckrodt Chemical Lab., Harvard U., Cambridge, Mass.
THE MICROWAVE FARADAY EFFECT IN WEAKLY MAGNETIC GASES, by Martin L. Sage. Rept. on Contract Nonr-1866(14). [1961] 17p. 5 refs. AD-254 231.

DESCRIPTORS: *Magnetic moments, *Gases, *Molecular rotation, *Magnetic fields, Theory, Measurement, Molecules, Polarization, Microwave frequency, Mathematical analysis, Nuclear spins.

The microwave Faraday Effect is proposed as a method of measuring rotational magnetic moments in gases. The theory of the Faraday Effect is developed using the method of Karplus and Schwinger (Phys. Rev. 73:1027, 1948). In particular, it is applied near a microwave absorption frequency of the gas. The magnitude of the effect indicates that the Faraday Effect may be a more satisfactory method of measuring small (less then 0.1 nuclear magneton) magnetic moments than the Zeeman Effect. However, it requires intensity rather than frequency measurements and so is difficult. (Author)

PB 159 679 $3.60

Mallinckrodt Chemical Lab., Harvard U., Cambridge.
THE MICROWAVE SPECTRUM OF METHYL NITRATE, by William B. Dixon and E. Bright Wilson, Jr. Rept. on Contract Nonr-1866(14). [1961] 31p. 31 refs. AD-253 043.

DESCRIPTORS: *Microwave spectroscopy, Frequency, *Methyl radicals, *Nitrates, Dipole moments, *Molecular structure, *Chemical bonds, Molecules, Molecular rotation, Measurement.

The ground state rotational constants of methyl nitrate show that the five heavy nuclei of the molecule lie in the same plane. The hydrogen atoms of the methyl group are found to be staggered with respect to the nearest oxygen of the NO_2 group. Satellites arising from excited states of the torsion of the NO_2 group were observed. Rough relative intensity measurements yield a frequency of 130 + or - cm for this normal mode and a barrier of 9100 + or - 2600 cal/mole. This would seem to indicate a significant amount of double bond character in the CO - N bond. The barrier to internal rotation of the methyl group, as determined from torsional satellite splittings, is 2321 cal/mole. Satellites arising from the combination first excited states of the methyl and NO_2 torsions have an anomalous appearance on the basis of the single internal rotor theory. (Author)

PB 158 434 $1.10

Maryland U., College Park.
STUDIES ON BOND DISSOCIATION ENERGIES OF DIATOMIC AND POLYATOMIC MOLECULES, by Ellis R. Lippincott. Final rept. on Contract DA 36-034-ORD-2175. Nov 60, 10p. 16 refs. OOR rept. no. 1607:8-C; AD-248 643.

DESCRIPTORS: *Molecular structure, Energy, *Chemical bonds, Molecular association, Molecules, Hydrogen, Analysis, Atomic structure.

Contents:
General relation between potential energy and internuclear distance for bonds of polyatomic molecules
A quantum mechanical derivation of an internuclear potential function
Potential function model of hydrogen bonds. II.
Hydrogen bond systems-temperature dependence of OH frequency shifts and OH band intensities
The calculation of the energy of activation for some simple reactions, I. The ortho-para hydrogen reaction
Reduced internuclear potential function
Delta function model of chemical binding
General relation between potential energy and internuclear distance of diatomic molecules II. Excited states

Solid State Physics

PB 159 684 $1.10

Burroughs Corp., Paoli, Pa.
A NOTE ON SUPERCONDUCTING VANADIUM THIN FILMS, by C. T. Thompson and J. F. Gerber. Rept. on Contract Nonr-2145(00). 9 Mar 61, 5p. 2 refs. TR-61-20; AD-253 747.

DESCRIPTORS: *Thin films, *Vanadium, Electrical properties, Electrical conductance, Mechanical properties, Thermoelectricity, *Metal films, Resistance, *Superconductors, Superconductivity.

The study of the properties of vanadium thin films has been extended. Two specimens gave quite different results in the resistance versus temperature behavior. One specimen, designated VB^2, has a rather broad transition beginning at 3.18 K and continuing to zero resistance at 2.02 K. There is no discontinuous transition observed. The substrate was a glass micro slide. Another specimen, designated VB4, has a resistance vs temperature curve which shows a transition beginning at 4.10 K and continuing to zero resistance at 3.66 K. The transition is much sharper than in sample VB^2. The film VB4 was of the same dimensions as VB^2. The substrate of VB4 was quartz. The ratio of resistance at 4.2 K and at 295 K was 0.30 for the latter specimen and 0.53 for the former. Mechanically the films are very tough. The adherence of the vanadium films is extraordinary, there being no visible film damage after drawing a steel scriber across the film. (Author)

TID-14182 $1.60

Case Inst. of Tech., Cleveland, Ohio.
SOLID STATE PHYSICS PROGRAM. Annual progress rept. Nov. 60 - Oct 61, on Contract AT(11-1)-623. 1 Nov 61, 17 refs.

TID-14228 $1.10

Illinois U., Urbana.
TECHNICAL REPORT NO. 1, by R. O. Simmons. Rept. on Contract AT(11-1)-971. Oct 61, 10p. 8 refs.

PB 159 822 $2.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
INTERACTIONS BETWEEN FAMILIES OF GLIDE DISLOCATIONS IN THE SODIUM CHLORIDE STRUCTURE, by B. H. Kear. Interim rept. on Contract Nonr-2608(00). Apr 61, 23p. 26 refs. Rept. no. I-A2182-1; AD-254 944.

DESCRIPTORS: *Single crystals, Crystals, Crystal structure, Lattices, Sodium compounds, Chlorides, *Deformation, Plasticity, Theory, Mechanical properties.

The characteristic orientations of the boundaries between differently slipped blocks that have been observed experimentally in single crystals of the sodium chloride type compressed in the cube orientation are discussed. It is shown that these can be explained in terms of interactions between different families of glide dislocations, which leads to the formation of diffuse low angle boundaries in certain orientations. These boundaries have been named secondary deformation bands. The available experimental evidence indicates that the mode of plastic deformation in a symmetry orientations is strongly influenced by constraints. (Author)

PB 159 726 $3.60

Laboratory for Insulation Research, Mass. Inst. of Tech., Cambridge.
BEHAVIOR OF Fe^{4+} IN THE SYSTEM $SrFeO_3$-$SrTiO_3$, by Thomas R. Clevenger, Jr. Doctoral thesis. Rept. on Contracts AF 19(604)6155 and Nonr-1841(10). Mar 61, 38p. 26 refs. Technical rept. 161; AD-254 505.

DESCRIPTORS: *Ferromagnetic materials, Ferroelectric materials, Ferroelectric crystals, *Ferromagnetism, *Dielectrics, Dielectric properties, *Paramagnetic crystals, Crystals, Crystal structure Lattices, X-ray diffraction analysis, Semiconductors, Ceramic materials, Strontium compounds, Iron compounds, Titanium compounds, Oxides, Ions, Magnetic properties, Electrical properties, Thermoelectricity, Low temperature research, Test equipment, *Titanates

Perovskites of the system $SrFeO_3$-$SrTiO_3$ were prepared and measurements made of their magnetic and electrical behavior. Chemical analysis showed the percentage of Fe^{4+} to vary from 72.5% for $SrFeO_3$ to about zero for $SrFe_{0.1}Ti_{0.9}O_3$; the rest of the iron is in the Fe^{3+} state. $SrFe_{1-x}Ti_xO_3$ is antiferromagnetic between $x = 0$ and $x = 0.9$, with a Neel temperature below 60 K. A parasitic ferromagnetic component developes when these compounds are cooled in a magnetic field. Its magnitude depends on the temperature and on

the magnetic field applied during cooling. Detailed studies were made on $SrFe_{0.8}Ti_{0.2}O_3$. The conductivity of these perovskites ranged from 10 to the -8th mho/cm for x = 0.01 for x = 0.0 and shows a marked break at x = 0.8. $SrFeO_3$ is an n-type semiconductor; with the addition of Ti^{4+} the sign of the thermoelectric voltage changes to p type. The activation energy decreases from 0.79 ev for $SrTiO_3$ to 0.05 ev for $SrFeO_3$ The Fe^{4+} content depends on the heat treatment and atmosphere during formation. (Author)

PB 159 727 $1.60

Laboratory for Insulation Research, Mass. Inst. of Tech., Cambridge.
DIELECTRIC AND X-RAY STUDIES OF $Ca_xBa_{1-x}TiO_3$ AND $Ca_xSr_{1-x}TiO_3$, by T. Mitsui and W. B. Westphal. Rept. on Contracts AF 19(604)6155 and Nonr-1841(10). Mar 61, 19p. 22 refs. Technical rept. 162; AD-254 506.

DESCRIPTORS: *Dielectrics, *Ceramic materials, *Crystals, Crystal structure, Lattices, Paramagnetic crystals, X-ray diffraction analysis, Ferroelectric materials, *Ferroelectric crystals, Dielectric properties, Phase studies, Phase transitions, Barium compounds, Calcium compounds, Oxides, Strontium compounds, Titanium compounds, Temperature, High temperature research, *Titanates.

Ceramics of $Ca_{(x)}Ba_{(1-x)}TiO_3$ and $Ca_{(x)}Sr_{(1-x)}TiO_3$ have been prepared and their dielectric and structural properties investigated. Firing conditions were adjusted to obtain sharp X-ray back reflections. The Curie point of $Ca_{(x)}Ba_{(1-x)}TiO_3$ increases with Ca concentration up to 136 C, where x is 0.08, and then decreases. Both the tetragonal-orthorhombic and the orthorhombic-rhombohedral transition points of $Ca_{(x)}Ba_{(1-x)}TiO_3$ decrease monotonically with increasing Ca concentration. $Ca_{(x)}Sr_{(1-x)}TiO_3$ solid solutions where x ranges between 0.01 and 0.10 are ferroelectric at very low temperatures. $SrTiO_3$ assumes a tetragonal structure below about 80 K. (Author)

PB 159 725 $2.60

Laboratory for Insulation Research, Mass. Inst. of Tech., Cambridge.
SOME PROPERTIES OF BISMUTH PEROVSKITES, by Carl F. Buhrer. Rept. on Contracts AF 19(604)6155 and Nonr-1841(10). Mar 61, 29p. 31 refs. Technical rept. 160; AD-253 293.

DESCRIPTORS: *Bismuth compounds, Titanates, Ferroelectric materials, Potassium compounds, Sodium compounds, Barium compounds, *Bismuth, Lattices, Complex compounds, Lead compounds, Zirconates, Ferroelectric crystals, Dielectric properties, Crystal structure, Phase studies, Transition temperature.

The crystallographic and dielectric properties of complex perovskites are described in terms of average A- and B-site ionic radii, charges, electronic structures, etc. The relative importance of these to the ferroelectric state is evaluated by a study of a number of solid solutions containing trivalent bismuth. Two new ferroelectrics, $Bi_{0.5}K_{0.5}TiO_3$ and $Bi_{0.5}Na_{0.5}TiO_3$, and the phase diagrams of the systems $Bi_xK_xBa_{1-2x}TiO_3$, $Bi_{0.5}K_xNa_{0.5-x}TiO_3$, $Bi_xK_xPb_{1-2x}ZrO_3$, and $Bi_xNa_xPb_{1-2x}ZrO_3$ are reported. (Author)

PB 181 171 $1.00

Little, Arthur D., Inc. [Cambridge, Mass.]
A RADIATION TECHNIQUE FOR THE MEASUREMENT OF THERMAL CONDUCTIVITY OF SEMICONDUCTORS BETWEEN 1000 AND 2000°C. Annual progress rept. for 1 Mar-31 Dec 60, on Contract Nonr-2974(00). 31 Dec 60, 40p. 8 refs. Rept. no. C-62403; AD-250 446.

DESCRIPTORS: *Semiconductors, *Thermal radiation, Conductivity, Measurement, Thermoelectricity, Instrumentation, Design, Radiation instruments, Heat transfer, Temperature.

Experimental work performed on the measurement of thermal conductivity of semiconductors between temperatures of 1000 and 2000°C is summarized. Details are given for experimental procedures for carrying out thermal conductivity tests, the apparatus constructed to perform the tests, methods for measuring temperatures and heat flux, calibration procedures, and thermal conductivity calculation procedures. (See also PB 153 766)

PB 159 695 $1.10

New York U., N. Y.
EXPLORATION OF P.I.P. FOR MEMORY APPLICATIONS. Status rept. 1 Dec 60-28 Feb 61, on Contract Nonr-285(25). [1961] 6p. AD-254 263.

DESCRIPTORS: *Polarization, Solid state physics, *Anthracenes, Crystals, *Memory devices, Computers.

Contents:
P.I.P. studies with anthracene crystals
Conductive metal electrodes on one side, barrier on opposite face
Electrolyte electrode on one face, barrier on opposite face
Radiation release speed

PB 159 861 $3.60

New York U., N. Y.
RESEARCH ON SOLID STATE RADIATION-INDUCED PHENOMENA, by Hartmut Kallmann. Quarterly progress rept. no. 7, Aug-Oct 59, on Contract DA 36-039-sc-75043. Dec 59, 37p. AD-232 854.

DESCRIPTORS: *Organic solvents, *Fluorescene, *Electrons, Excitation, *Gamma rays, Photochemical reactions, Photomultipliers, Naphthalenes, Xylenes, Phosphors.

Contents:
Quenching of energy transfer
Effects of electric fields upon the fluorescence of inorganic phosphors.
Variation of fluorescence of organic solutions with temperature and concentration.

PB 158 436 $1.10

North Carolina U. [Chapel Hill].
BASIC RESEARCH ON INTERACTION BETWEEN MECHANICAL AND PHOTOCONDUCTIVE EFFECTS IN SILVER CHLORIDE, by Lawrence Slifkin. Final rept. 1 May 56-30 Apr 60, on Contract DA 36-034-ORD-2276. [1960] 8p. OOR rept. no. 1656:1-P.

DESCRIPTORS: *Silver compounds, *Chlorides, *Single crystals, Crystals, Plasticity, Plastic flow, Deformation, Optics, Temperature, Electrical effects, Photoconductivity, Conductivity, Cosmic rays, Detection.

This report summarizes: (a) plasticity studies on single crystalline silver chloride, (b) effects of plastic deformation on the optical absorption edge of AgCl, (c) effects of thermal history on the ionic conductivity of AgCl, (d) transient electrical phenomena during plastic flow of AgCl, (e) annealing properties of internal print-out silver in AgCl, and (f) exploration of possible cosmic ray detection in large silver chloride crystals.

PB 159 814 $1.60

Northwestern Technological Inst., Evanston, Ill.
NON-OHMIC BEHAVIOR IN NEAR-STOICHIOMETRIC RUTILE (TiO_2) by E. H. Greener and D. H. Whitmore. Technical rept. no. 2 on Contract Nonr-1228(16). 12 Apr 61, 13p. 10 refs.
AD-254 170.

DESCRIPTORS: *Titanium compounds, Oxides, Dioxides, Electrical properties, Resistance, Electric currents. Temperature. *Single crystals, Thermoelectricity, Electrical conductance, Measurement, Test methods, Heating, Dielectric properties.

Experimental observations of the isothermal current-voltage relationships in rutile (TiO_2) over the temperature range 632 to 908 C have shown that currents in excess of ohmic currents can be drawn through small, single crystals of near-stoichiometric composition. These currents have been identified as space-charge-limited currents, analogous to those observed in the case of a vacuum diode. Increasing the ambient specimen temperature had the effect of displacing the potential for transition from ohmic to non-ohmic behavior to greater values so that at 908 C near-stoichiometric rutile exhibited only ohmic currents even at the largest fields employed. (Author)

AD-261 201 $8.10

Ohio State U. Research Foundation, Columbus, Ohio.
DIFFUSION OF IMPURITIES INTO SILICON THROUGH AN OXIDE LAYER, by M. O. Thurston, J. C. C. Tsai, and K. D. Kang. Final rept. for Jan 59-Jan 61, on Contract DA 36-039-sc-83874. Mar 61, 81p. 7 refs. Rept. 896-Final.

DESCRIPTORS: *Silicon, Impurities, Oxides, Thin films, Oxidation, Diffusion, Temperature, Phosphorus, Boron, Antimony, *Single crystals, Mathematical analysis, Surfaces, Differential equations, Quartz crystals, Air, Measurement, *Semiconductors, Theory.

Theoretical studies have been made of the diffusion of impurities into silicon through an oxide film. In one case the silicon was assumed to be initially free of oxide and to oxidize parabolically during the diffusion. In the second case the initial oxide film on the silicon was assumed to be sufficiently thick and the diffusion time sufficiently short that a linear approximation for the oxide growth could be used. Experimental results consistent with the analysis have been obtained using the box method of D'Asaro with phosphorus, boron, and antimony as diffusants. The diffusivities in the oxide layer for these three doping agents have been determined experimentally in the temperature range from 1150 to 1350°C and for various concentrations. All diffusions were done in air. (Author)

PB 159 686 $8.60

South Dakota School of Mines and Tech., Rapid City.
HIGH TEMPERATURE THERMAL CONDUCTIVITY IN BISMUTH TELLURIDE (Bi_2Te_3) AND SILICON (Si), by Jerome Gerhard Hust. Master's thesis. Technical rept. no. 2 on Solid State Physics Project, Contract Nonr-2964(01). 1 Mar 61, 96p. 50 refs.
AD-251 689.

DESCRIPTORS: *Heat transfer, Tellurides, *Bismuth compounds, Intermetallic compounds, *Semiconductors, *Silicon, Solids, Alloys, High temperature research, Single crystals, Crystals.

The thermal conductivity of two samples of p-type polycrystalline bismuth telluride and two samples of p-type single-crystal silicon was measured by a series comparative method from 30 to 330 C for bismuth telluride and 30 to 425 C for silicon. Armco iron was used as the standard material. Lowest-resistance thermal contacts between the standards and the sample were obtained with powdered graphite in sodium silicate solution. These good contacts greatly reduce radiation loss between the samples and the surroundings. Radial heat flow was further reduced by placing the sample holder in a vacuum of about 1/100,000 mm of Hg, by surrounding the standard-sample-standard sandwich with a three-piece Lava radiation shield, and by clamping the thermocouple

wires in a Lava heat sink. The average room-temperature thermal conductivity of Bi_2Te_3 is 0.005 cal/cm sec degree C. The thermal conductivity of silicon is found to vary linearly with the reciprocal of the absolute temperature, having a value of 0.30 cal/cm sec degree C at 30 C and a value of 0.11 cal/cm sec degree C at 425 C. These results indicate that the lattice conductivity is predominant in this temperature range. (Author)

Theoretical Physics

PB 159 848-1 $23.50

Cruft Lab., Harvard U., Cambridge, Mass.
TABLES OF COULOMB WAVE FUNCTIONS. VOLUME I. (r = 2.0 - r = 8.3), by Martin Blume, Norman Briggs, and Harvey Brooks. Rept. on Contract Nonr-1866(16). 1 Apr 59, 463p. 9 refs. Technical rept. no. 260; AD-218 751.

DESCRIPTORS: *Quantum mechanics, *Functions, *Tables, Electromagnetic fields, Differential equations.

The solutions and the derivatives of the solutions are tabulated of the differential equation

$$\frac{d^2U^{(l)}}{dr^2} + \left[E + \frac{2}{r} - \frac{l(l+1)}{r^2}\right] U^{(l)} = 0$$

This is the radial part of the hydrogenic wave equation expressed in atomic units (energy in rydbergs and distance in Bohr radii). The tables are accurate to 7 significant figures. They run from r = 2.0 to r = 15.0 in intervals of 0.1, and from $\varepsilon(=-E) = 0.07$ to $\varepsilon = 1.20$ in intervals of 0.01. The functions are grouped so that all values of ε for a given r are adjacent in the tables. For each set of values of ε and r the solutions for l = 0, 1, 2 are listed consecutively. (Author)

PB 159 848-2 $22.25

Cruft Lab., Harvard U., Cambridge, Mass.
TABLES OF COULOMB WAVE FUNCTIONS. VOLUME II. (r = 8.4 - r = 15.0), by Martin Blume, Norman Briggs, and Harvey Brooks. Rept. on Contract Nonr-1866(16). 1 Apr 59, 429p. Technical rept. no. 260; AD-219 947.

DESCRIPTORS: *Quantum mechanics, *Functions, *Tables, Electromagnetic fields.

See also PB 159 848-1.

TID-14136 $3.60

Illinois U., Urbana.
THE POSTULATES OF QUANTUM FIELD THEORY, by R. Haag and B. Schroer. 3 Nov 61, 31p. 29 refs.

LAMS-2616 $1.00

Los Alamos Scientific Lab., N. Mex.
COULOMB WAVE FUNCTIONS, by Johan G. Belinfante. Rept. on Contract W-7405-eng-36. 19 Feb 62, 41p. 15 refs.

Thermodynamics

PB 159 803 $5.60

AeroChem Research Labs., Inc., Princeton, N. J.
DIFFUSION AND CHEMICAL SURFACE CATALYSIS IN FLOW SYSTEMS, by Daniel E. Rosner. Rept. on Contracts AF 49(638)300 and AF 33(616)6216. Sep 59, rev. July 60, 59p. 39 refs. Technical publication no. 14; AFOSR TN-60-887; AD-250 994.

DESCRIPTORS: *Catalysis, Temperature, Mathematical analysis, Diffusion, Surfaces, Fluid flow, Heat transfer, Theory.

The role of a catalytic parameter governing the transition from activation to diffusion controlled heterogeneous kinetics in flow systems is discussed with respect to the determination of reaction rate distributions along catalytic surfaces of arbitrary shape and chemical activity, energy transfer from dissociated gases to catalytic surfaces, and correction factors in the theory of differential catalytic probes in analytical chemistry. Detailed, closed form solutions are given to the laminar flow catalytic plate problem with arbitrary reaction order. The method corrects for the influence of the history of the surface reaction on the diffusional mass transfer coefficient itself. (Author)

NAA-SR-6550 $0.50

Atomics International, Canoga Park, Calif.
TEMPERATURE DISTRIBUTION IN A HOLLOW CYLINDRICAL CUP WITH A STEM, by Guy W. Lehman. Rept. on Contract AT(11-1)-GEN-8. 15 Feb 62, 19p. 4 refs.

PB 159 765 $1.10

Ohio State U. Research Foundation, Columbus.
COMPRESSIBILITY, ZERO POINT ENERGY AND SPECIFIC HEAT IN SEMICONDUCTORS, by J. G. Daunt and J. L. Olsen. Technical rept. 1 on Contract [Nonr-495(20)]. Apr 61, 9p. 10 refs. RF Project 989; AD-254 738.

DESCRIPTORS: *Superconductors, Elasticity, Tin, Indium, Niobium, *Specific heat, Energy.

The specific heats of indium, niobium and tin in the superconducting state at the lowest temperatures are considerably smaller than the lattice specific heats deduced from measurements in the normal state. Such a phenomenon would be easily understood if there were correspondingly large differences in the elastic constants in the Debye characteristic temperatures, D, of the two states. It is shown that even the very much smaller changes in D which are known to exist can influence the zero point energy enough to allow an explanation of the observations. (Author)

PB 157 779 $4.60

Electronic Defense Labs., Mountain View, Calif.
FM-SIGNAL DEMODULATION IN MICROWAVE FREQUENCY-COMPRESSION RECEIVERS, by William L. Sweet. Rept. on Contract DA. 36-039-sc-85402. 3 Feb 61, 41p. 11 refs. Technical memo. no. EDL-M334; AD-252 712.

DESCRIPTORS: *Radio signals, *Microwaves, *Frequency modulation, *Radio reception, Broadband, *Radio receivers, Modulation, *Microwave equipment, Signal to noise ratio, Discriminators, Detection, Limiters, Circuits, Electronic circuits.

Reception of broad-band FM signals may be improved by employing the technique of frequency compression in the receiver. Frequency compression is briefly compared with other FM reception techniques, and its application in microwave receivers is discussed. The limitations of an experimental microwave frequency-compression receiver, which are imposed by stability requirements in the frequency-control loop, are described. When knowledge of instantaneous received frequency is desired, the frequency-compression receiver can provide a distinct improvement in accuracy, for weak signals, over the performance of a receiver with a wide-band discriminator. A demonstration of this improvement is discussed, and the possibility of combining several FM reception techniques is considered. (Author)

NYO-9763 $4.60

Institute of Mathematical Sciences, New York U., N. Y.
THE DEVELOPMENT OF COMPRESSION WAVES IN AN ADIABATIC TWO-FLUID MODEL OF A COLLISION-FREE PLASMA, by K. W. Morton. Rept. on Contract AT(30-1)-1480. 30 June 61, 41p. 14 refs. MF-24.

NYO-9762 $11.00

Institute of Mathematical Sciences, New York U., N. Y.
PROPAGATION OF LONG WAVELENGTH DISTURBANCES IN A PLASMA, by Richard L. Liboff. Rept. on Contract AT(30-1)-1480. 2 Oct 61, 139p. 39 refs. MF-22.

Order from GPO $0.55 as C 13.44:33

National Bureau of Standards, Washington, D. C.
AN EXPERIMENTAL STUDY OF PHASE VARIATIONS IN LINE-OF-SIGHT MICROWAVE TRANSMISSIONS, by K. A. Norton, J. W. Herbstreit and others. 1 Nov 61, 91p. 3 refs. NBS Monograph 33.

DESCRIPTORS: *Microwaves, *Transmission, Radio signals, Radio (Noise), Antennas, Atmospheric refraction, Refractive index, Refractometers, Wind, Velocity, *Radio waves, *Propagation.

During 1956 an experiment was conducted at Maui, Hawaii, to study the time variations in the phase of arrival of microwave signals propagated over a 15-mile line-of-sight path and the time variations in the phase difference of signals originating at a common antenna and received at two points on a horizontal baseline normal to the propagation path. These time variations are analyzed in terms of their serial correlation functions and power density spectra for different times of day, and for several baseline lengths ranging from 2.2 to 4,800 feet. The slope of the power spectra and the total variance of phase difference variations are shown to be dependent upon baseline length. In some instances there was evidence of a diurnal cycle in total variance of both phase and refractive index, with larger variances during the day time, but in other instances this diurnal effect was not detectable. The slope of the phase spectra appeared to be independent of time of day or meteorological conditions. The long-term variations in single-path phase were well correlated with variations in the mean value of refractive index measured at 5 points along the path. (Author)

RESEARCH METHODS, TECHNIQUES AND EQUIPMENT

AD-269 700 $2.25

Armed Services Technical Information Agency, Arlington, Va.
MANAGEMENT OF SCIENTIFIC RESEARCH. AN ASTIA REPORT BIBLIOGRAPHY, by Herman W. Miles. 1 Jan 62, 82p. 479 refs.

DESCRIPTORS: *Scientific research, *Industrial research, *Military research, *Research program administration, *Management engineering, Economics, Procurement, Costs, Industrial production, Industrial mobilization, Scientific personnel, Industrial relations, Labor unions, Symposia, Conferences, Documentation, Bibliography.

This bibliography was prepared in response to frequent requests for information concerning scientific management, and because of the subject's relevancy to the Defense Department's Research and Development effort. References are arranged alphabetically by subject areas, and include entries on cost administration, communication of R&D data, economics, industrial mobilization, production and procurement. References are included on the evaluation and planning of research programs, as well as a section on Scientific manpower, and a listing of foreign and domestic research programs. Within each subject area, references to military reports are arranged alphabetically by source and title; reports published by Department of Defense contractors are cited by source, contract, and date. All citations included are for documents cataloged by ASTIA from 1953 thru 1 January 1962. (Author)

Order from GPO $2.00 as
D 101.52/2:961/v. 6

Army Research Office, Washington, D. C.
ARMY RESEARCH TASK SUMMARY, FISCAL YEAR 1961. VOLUME 6. ELECTRONICS, MATHEMATICS, OPERATIONS RESEARCH, PLANNING AND SYSTEMS RESEARCH, AND INTERDISCIPLINARY RESEARCH. 427p.

DESCRIPTORS: *Electronics, Automatic, Data processing systems, Communications theory, Electron tubes, Electronic circuits, Electromagnetic theory, Instrumentation, Magnetism, Navigation, Information theory, Targets, Detection, *Mathematics, Algebras, Number theory, Geometry, Topology, Mechanics, Probability, Statistical analysis, *Operations research, Programming, Logistics, Games theory, *Research program administration, Economics, Cybernetics, Control systems, *Military research

Electronics: Automatic data processing systems research; Communications techniques; Electronic tubes and parts; Electronic circuitry; Electromagnetic phenomena; Instrumentation; Magnetic technology; Navigational electroncs; Network studies and information theory; Sensory devices and technology; Solid state devices; Target detector research. Mathematics: Algebra and number theory; Analysis; Computation methods and techniques; Geometry and topology; Information theory; Mathematical physics; Mechanice; Numerical and graphical methods; Operations analysis; Probability and statistics. Operations research: Allocation, mathematical programming; Inventory and logistics theory; Game theory and war gaming; Simulation and modeling; Communication and information theory; Economic, social, political analyses. Planning and systems research: Technological forecasting; Systems analysis and optimization; Value theory. Interdisciplinary research: Cybernetics and automata; Adaptive systems, optimal control; Pattern recognition; Biosystem organization, function, regulation
(See also PB 171 005)

Photographic Equipment

PB 159 688 $3.60

Dunlap and Associates, Inc., Santa Monica, Calif.
INVESTIGATION OF ADDITIVE COLOR PHOTOGRAPHY AND PROJECTION FOR MILITARY PHOTO-INTERPRETATION. II. LABORATORY COMPARISON OF SIMULATED PANCHROMATIC, COLOR AND INDIVIDUAL ADDITIVE COLOR IMAGE SEPARATION, by Richard P. Winterberg and Joseph W. Wulfeck. Technical rept. 2 on Contract Nonr-3137(00). Mar 61, 36p. 3 refs. AD-254 492.

DESCRIPTORS: *Military intelligence, Photographic intelligence, Effectiveness, *Color photography, Processing, Reliability.

A laboratory study was conducted in order to assess the relative value of panchromatic, full color, and three additive color separations as formats for projecting photographed images. Using artificial materials, more targets were detected and more detail resolved in the three separated images than either panchromatic or full color. Full color appears to aid in the detection of objects without increasing the ability to resolve detail within these objects. This study confirms the theoretical capability of additive color photography for contrast enhancement in terms of visual parameters relevant to photo-interpretation. (Author) (See also PB 158 561).

PB 157 789 $1.10

Eastman Kodak Co., Rochester, N. Y.
MINICARD INFORMATION AND INTELLIGENCE DATA HANDLING SYSTEM, by J. W. Kuipers. Progress rept. letter no. 1, 30 June-31 July 54, on Contract AF 30(602)1188. 16 Aug 54, declassified 15 July 58, 2p; AD-51 916.

DESCRIPTORS: *Data processing systems, Design, Aerial reconnaissance, *Aerial photography, *Aerial cameras, Cameras, Data, Handling.

SOCIAL SCIENCES

Documentation

AD-267 000 $18.00

Armed Services Technical Information Agency, Arlington, Va.
DOCUMENTATION. AN ASTIA REPORT BIBLIOGRAPHY. 1 Dec 61, 285p. 558 refs.

DESCRIPTORS: Bibliography, *Documentation, *Machine translation, *Reading machines, *Speech representation.

This bibliography was prepared by ASTIA in response to frequent requests for information concerning scientific documentation and related topics. Citations are included for documents cataloged by ASTIA from 1953 through 1 Dec 61. In addition to references dealing specifically with information retrieval systems, entries have been included covering the subjects of artificial intelligence, information theory, character and pattern recognition, mechanical translation, linguistics, and speech analysis because of their potential relevance to documentation. Citations are also included describing the operation and services of various technical information centers. Entries are arranged by subject area, and within each category, reports published by the Department of Defense contractors are listed alphabetically by source, contract and date; military reports are arranged by source and title. (Author)

PB 159 838 $3.60

Pennsylvania State U. Coll. of Chemistry and Physics, University Park.
EXAMPLE OF AN ABSTRACT: A PORTION OF THE BARKER INDEX, by R. Pepinsky and V. Vand. Rept. no. 7 on Contract AF 49(638)416. 23 Apr 58, 32p. AFOSR TN-59-1051; AD-228 889.

DESCRIPTORS: *Documentation, *Data processing systems, Indexes, Reproduction, Crystals, Punched card methods, Abstracting.

MISCELLANEOUS

PB 181 071 $1.25, $10.00/year

Naval Research Lab., Washington, D. C.
REPORT OF NRL PROGRESS. Apr 62.

DESCRIPTORS: *Naval research, *Scientific research, Niobium, Tin, Zirconium, Oxygen, Carbon, Nitrogen, Lithium, Hydrides, Vortices, Clouds, Atmosphere, Astrophysics, Radioactivity, District of Columbia, Light transmission, Chemistry, Electrodes, Silver compounds, Oxides, Batteries, Mathematics, Mechanics, Steel, Fourier analysis, Thermal stresses, Plastic flow, Hypervelocity guns, Gas leaks, Metallurgy, Ceramic materials, Rocket motors, Fracture (Mechanics), Neutrons, Radiation damage, Nuclear power plants, Zinc compounds, Iron, Pipes, Joints, Corrosion, Fatigue (Mechanics), Nuclear physics, Neutron diffraction analysis, Palladium, Hydrogen, Radio, Antennas, Communication systems, Thermionic emission, Electron tubes, Scientific reports, Patents.

Contents:
Articles:
Critical Transition Properties of Nb_3Sn and Nb-25%Zr, by J. Babiskin and P. G. Siebenmann
Determination of Oxygen, Carbon, and Nitrogen in Lithium and Lithium Hydride by Photon-Activation Analysis, by B. J. Faraday and C. R. Bingham
An Application of Potential Vorticity Theory to Elevated Radio-Progagation Ducts in Stratus-Type Cloud Layers, by D. L. Randall
Scientific Program:
Atmosphere and Astrophysics: Atmospheric radioactivity at Washington, D. C., 1950-1961. Airborne measurements of visible light signals transmitted beyond the horizon
Chemistry: Electrode processes--a survey: 1956 - 1961. Anodization of the silver-silver oxide electrode at 0°C and 25°C in alkaline solutions. The lead calcium battery: small portable cells
Mathematics: Decomposition theorem concerning linear graphs
Mechanics: Effects of loading speed and temperature on crack toughness and yield strength in mild steel. Numerical procedure for shock and Fourier analysis. Numerical method for determining thermal stresses involving plastic flow. Detection of light-gas leakage in hypervelocity guns by chromatography
Metallurgy and Ceramics: Crack propagation resistance of high-strength sheet materials for rocket motor casings. Fracture toughness tests of 5%Cr-13%Mo-0.5%V steel. Classification of fracture surface in steel--part 1. Analysis of engineering and basic research aspects of neutron embrittlement of steels. Possible method for assessing radiation damage in an operating nuclear power plant. Removal of interstitial impurities from niobium by zinc-niobium compounds. Preparation of sample solutions for the determination of ferrous iron. New test for evaluating the performance of brazed piping joints. Cathodic protection and low-cycle corrosion fatigue
Nuclear and Atomic Physics: Neutron diffraction study of palladium-hydrogen systems
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- Statistics on imports and exports
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- Economic conditions in foreign countries

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To make the services of the Department of Commerce more widely available, agreements have been entered into with more than 750 Chambers of Commerce, Manufacturers Associations, and similar business groups under which these organizations have become official Cooperative Offices of the Department. If specific information is not on hand in the Cooperative Office, your problem will be referred to the nearest Departmental field office.

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